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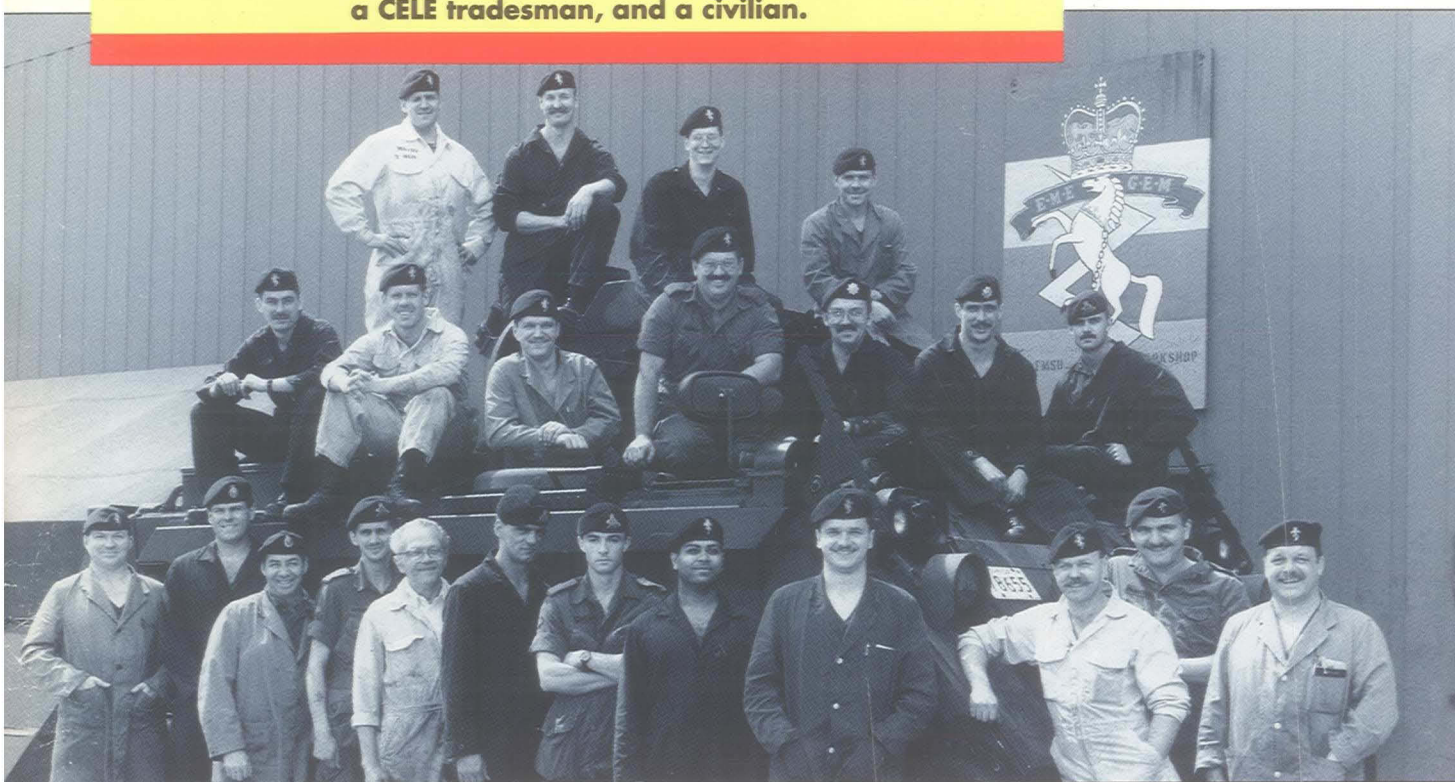
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# EME JOURNAL

FALL 1993

## THE MODIFICATION TEAM FOR CFE-BASED TUA.

This photograph exemplifies the spirit of EME: the cooperation necessary between all trades, arms, and ranks to achieve our aims. Note that the team includes EME personnel, combat arms, a CELE tradesman, and a civilian.



From left to right • **Front row:** Sgt C. Eggleton, Cpl P.R. Kramer, WO M. Dufour, Cpl Y. St-Pierre, Mr. S. Schon, MCpl J. Grimard, Cpl C. Gunther, Cpl L. Mohan, Capt D. Thériault, Cpl R.M. Tutty, Cpl J. Parsons and CWO D. Smulski • **Second row:** MCpl R.M. Baldson, MCpl M.R. Jackson, Cpl W.G. Marche, Cpl A.L.M. Kennedy, Cpl S. Collins, Cpl P.K. Murphy and Pte J.B.C. Bergeron • **Third row:** Cpl J.G. Boudreault, Cpl O.L. Crampton, Cpl I.M. Mackie, and MCpl J. Baker • **Missing from the picture are Cpl J. Levesque and Cpl A. Arsenault** • See page 33 for an article on the TUA modifications in Winnipeg.

Canada

# EME JOURNAL



The EME Journal is the magazine of the Land Electrical and Mechanical Engineers, published at NDHQ under the terms of reference of the Director General Land Engineering and Maintenance and the LEME Branch Adviser. The purpose of the publication is to disseminate professional information among members and exchange opinions, ideas, experience and personnel news, and promote the identity of the LEME Branch.

The EME Journal depends upon its readers for content. Articles on all aspects of the Electrical and Mechanical Engineering System, photographs, cartoons, people news and comments are solicited. Readers are reminded that the Journal is an unclassified and unofficial source of information. The contents do not necessarily represent official DND policy and are not to be quoted as authority for action.

Contributors are asked to submit the original text typewritten, accompanied by a disc in Wordperfect format. Photos should be sharp, glossy black and white or colour prints with captions typed separately. Personnel should be identified in all cases, both text and captions, by rank, initials, surname, trade and unit.

The editor reserves the right to reject and edit any editorial material and while every effort is made to return artwork and photos in good condition the Journal can assume no responsibility for this.

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# From the New DGLEM and Branch Advisor

Brigadier-General V. Pergat

As I write my first words in the EME Journal as Branch Advisor, I am conscious of the privilege I have been given to serve the LEME Branch in this fashion. I have, over my career, had the opportunity to serve in many locations and in many varied jobs, but the most rewarding experience has been serving with a great many talented EME people. Speaking of talented people, I wish to thank, on behalf of the Colonel Commandant and all members of the LEME Branch, the previous Branch Advisor, MGen Fischer. Following his successful tenure as DGLEM and Branch Advisor, MGen Fischer was promoted and is now Associate Assistant Deputy Minister(Materiel). I look forward to the challenge of continuing the excellent work of my predecessors.

There is rarely a time when the Canadian Forces are not undergoing changes, but the past several years have been particularly tumultuous. The effects of budget cuts, withdrawal from Europe, increased peacekeeping commitments, and force reduction, to name a few, will continue to have a significant effect on the LEME Branch. Fortunately, we are blessed with a group of officers and non-commissioned members who are second to none in their dedication, leadership ability, and flexibility. With your help, I am sure the LEME branch will be able to take full advantage of the opportunities that invariably accompany change. I will ensure you are kept abreast of future changes, and the direction our Branch will take.

The RCEME 50th Anniversary celebrations are almost upon us, and I encourage all of you to take an active part in the planning, preparation, and enjoyment of the anniversary.



National activities will include the unveiling in Borden of the commemorative monument, a skills demonstration team, commemorative art work and document, and a display in the National War Museum. There will also be celebrations everywhere there are LEME personnel in Canada and abroad. The next EME Journal will include a schedule of events with a brief explanation of each. Fund-raising is proceeding well, but there is room yet for more names on the monument, and a minimum donation will ensure your place in history!

If anything, the preparations for our 50th Anniversary have bonded the various EME family organizations

even closer. For officers, the LEME Association has placed greater priority on the recruitment of serving officers. The LEMEA has increasing relevance in these times of change, as they are able to exert influence, through membership in the Conference of Defence Associates(CDA), on issues that affect the LEME branch. This is done through the CDA's Annual General Meeting and the resulting resolutions which are presented to the Minister. For all ranks, the RCEME Association brings together serving and retired members of the Branch to foster esprit-de-corps and maintain EME family unity. In addition, local chapters of LEMEA and RCMEA have an annual program of interesting professional and social activities. I urge you to join your local chapter, or as a member-at-large; your participation will help these organizations better appreciate current issues. In return, you will enjoy the camaraderie of retired and serving members and make interesting contacts with the private sector.

In my mind, the LEME branch is a true family, which includes Regular and Reserve Force members, civilians working in any capacity for the Land Maintenance System, and retired members. In my capacity as Branch Advisor, I, and the Colonel Commandant and Branch Chief Warrant Officer, will make every effort to attend as many Branch activities as possible to meet you. I always welcome any comments or suggestions that will ensure a strong and vibrant LEME Branch in our anniversary year of 1994, and for the future.



# Colonel Commandant's Comments

*By Colonel M.C. Johnston*

Well, you may say, what does the Colonel Commandant really do? Why do we bother to have one? We see him on parades, he visits our units, he talks with us. But what is his role? Here is a brief answer to these questions.

The history of the position of Colonel Commandant has its origins in the regimental system of the British Army. It begins in the early 18th Century when the term "Colonel of the Regiment" came into use. A Colonel of the Regiment was a senior, highly respected former officer of the regiment. He was nominated by the officers of the regiment to be the "embodiment of the spirit of the regiment".

It was his duty to foster the heritage of the regiment and to carry on its traditions and customs. In short, he was to help in establishing and maintaining the culture of the organization. This was important because the work of the army was both dangerous and required team work. The regimental system recognized this and the fact that the soldier was the most important resource of the army.

This idea has been extended to all branches of the Canadian Forces. For a Branch, however, the appointment is called Colonel Commandant and each Branch has one. A Colonel Commandant is appointed by the Minister of National Defence on the advice of the Chief of the Defence Staff. The appointment is an honorary one and normally goes to retired officers of the Branch who held the rank of colonel or above. The responsibilities include:

- fostering esprit de Corps throughout the Branch,
- providing advice on matters of significance to the Branch,
- liaising between Regular and Reserve Force units of the Branch; and
- liaising between affiliated formations, regiments and units.

Each Branch, in addition to a Colonel Commandant, has a Branch Advisor. Our Branch Advisor is BGen V. Pergat, the DGLEM. The Branch Advisor acts as a focal point for Branch identity and provides advice to the Personnel Group in NDHQ.

Many Branches also have a Branch CWO. Ours is CWO A.E. Rest. This appointment goes as a secondary duty to a serving Regular Force CWO. The responsibilities include providing the Branch Advisor with advice on personnel and training of the noncommissioned members of the Branch.

The Colonel Commandant, the Branch Advisor, and the Branch CWO fulfil their functions best by visiting units and meeting and talking with people. It is a way, probably the best way, of getting direct feedback from the field to NDHQ. To give you an idea of what this means, here is a brief outline of some of my activities in 1991 since I became the LEME Colonel Commandant on July 1st.

I visited many LEME units, including the EME and Air Defence Artillery schools, 3108 Cadet Corps (LETE), 26 and 28 Service Battalions, the LFCA militia concentration in Petawawa, DGLEM directorates and PMOs, LETE, 3 RCHA Maint Tp, 2 PPCLI Maint PI and the Base work-

shops and organizations at Shilo, Winnipeg, Kingston, Gagetown and Chatham. I attended the Air Command Maintenance Working Group. I also participated in meetings of the LEME Senate and the 50th Anniversary Steering Committee. I have participated in LEME projects by writing a foreword for the 50th Anniversary Commemorative Document, helping with the museum display for the 50th Anniversary and contacting many of you to arrange for information for an article in the EME Journal on LEME as a peacekeeper.

In representing LEME in Canadian and Military Activities, I arranged with the Department of Veterans Affairs for a RCEME veteran who served in Italy in the last war to be part of a tour of the Canadian battlefields in Italy during September. I answered a request from the Curator of the REME Museum in England for information on the RCEME workshops in England during the last war. On Remembrance Day, the Branch CWO and I laid a wreath on behalf of the Branch at the RCEME Memorial Gates. In December I attended the biennial Honourary Colonels' Conference. This conference brings together 150 honorary colonels and Colonel Commandants from all Branches and from all across Canada for an update on defence policy and trends.

You might ask, Why do we bother with all this? In a nut shell, it is all part of the process of giving us a sense of pride, perspective, and knowledge in our profession as the Electrical and Mechanical Engineers of Canada's Armed Forces.

*Arte et Marte.*

# New Production Editor

Greetings from the wonderful world of NDHQ! I'm Major Mark Espenand, and starting with this issue I'm the new Production Editor of the EME Journal. As you can imagine, that means I do all the actual work!

The EME Journal is authorized 4 issues per year; historically, it has been published 1-3 times per year. I intend to create 4 issues in the coming year, on the schedule below, but to do

so will require lots of support from you, the reader, as I can't possibly write all the articles myself!

**Anyone** in the EME world can be an author! I would like to see articles from Craftsmen and Colonels, mechanics and secretaries. The following are suggested topics, but the Journal will publish anything that is in good taste and will be of interest to others in our extended family.

**Technical.** Describe the latest project being done at your workshop, the newest machine/device/technology being developed or purchased by your directorate, or a handy repair technique.

**Organization.** Tell about your place of work, what it does and how. What makes your organization special?

**Personal/Personnel.** Did someone have a special day, receive an award, do something of interest? Tell us about significant accomplishments.

**Celebrations.** Tell about your unit party, or what you're doing to support the 50th Anniversary fund-raising, or....

**Exercises/Deployments.** What was it like in Somalia, or Bosnia, or Blackdown Park?

In all cases, a picture is worth a thousand words!

## EME Journal Production Schedule

Edition	Publication Date	Articles to NDHQ
1/94	15 Feb 94	1 Oct 93
2/94	1 May 94	1 Dec 93
3/94	15 Jul 94	15 May 94
4/94	15 Oct 94	15 Aug 94
1/95	15 Feb 95	1 Oct 94

Note: Journal 4/94 will be a special edition exclusively on the EME Birthday celebrations. Start planning now to submit an article, as I want one from everybody!

# EME Journal Funny Story Contest

How many of you have funny, amusing, silly, or otherwise interesting stories about something you did or witnessed during your military career? How many of you **don't** have at least one such story? The EME Journal would like to hear them, and will publish the best stories in future

issues of the Journal. There will even be a prize, obtained from your very own EME Kitshop! Who knows, you could be famous!

Stories can be on any topic in a military context to a maximum of 500 words. Please remember the bounds

of good taste, and try to avoid unnecessary slander. Entries must be received at NDHQ/SO LEME by 1 May 94, and the winning entry will be published in Journal 3/94. Stories will be judged on originality and the "laugh quotient"; polished english(or french) is not required.



# Award of Medals to Korean War Veterans

by Capt Eric Desgagné

On 13 May 92, as part of the EME Day celebrations, 202 Wksp held a parade to award the Canadian Volunteer Service Medal to 60 veterans of the Korean War. Under exceptional weather conditions, Colonel Yves St-Laurent commanded the parade with the guest of honour, Mr Émile St-Jean, Regional President of the Korean War Veterans.

202 Wksp took the initiative of organising this ceremony to underline the importance of this medal in recognizing the contribution of the veterans. With great pride, the veterans formed two platoons and received their medals from a military with which they will always identify.



Colonel St-Laurent congratulates a Korean War veteran after the award of his medal.



Mr Émile St-Jean signs the 202 Wksp honour roll.

## Beyond the Call

Mr. Dewey Williams receives a medallion from BGen V. Pergat for 45 years of combined military and civilian service to DND. This medallion, inscribed by the Minister of National Defence, is the highest award for continuous service that can be bestowed on a member of DND. Mr. Williams' military career started with the Royal Regiment of Canadian Artillery in May 1938 and continued until Nov 1978, a total of 40.5 yrs. Upon retiring from the military, Mr. Williams worked, and is still working,

for the public service as a technical writer for DND in DLAEEM. In total Mr. Williams has served for over 55 years, which makes him the longest serving combined military and civilian member still working for DND or anywhere else in the national public service.



## LCol (Retired) Fred Parsons Receives Korea Medal

During a short ceremony on 11 February 1992, BGen R.N. Fischer presented LCol (Retired) Fred Parsons with the Canadian Volunteer Service Medal for Korea. The Col Comdt, Col Johnston, witnessed this memorable event. LCol(Retd) Parsons, who now works as the Senior

Engineer in the LLAD Project, served in Korea as a 19 year-old craftsman with 2RCHA Light Aid Detachment (LAD) from April 1951 to May 1952.



## Major Johnson Receives Air Command Award



The Commander Air Transport Group, BGen JC Brace, presents the Air Command "Commander's Commendation" to Major Johnson, Wing EME Officer for 8 Wing in Trenton, for the following reasons:

"In hosting the first-ever CF Safety and Health Awareness Day at CFB Trenton. The resounding success of this undertaking was directly attributable to the outstanding efforts and organizational abilities of Major Johnson, and set the standard for Occupational and Personnel Safety Programmes in Air Command."



# Mr Charron Receives ADM(MAT) Award

by Capt Charles Frost

Last summer, the Assistant Deputy Minister (Materiel), Mr. R.D. Gillespie, selected Mr. Ron Charron to receive the ADM(Mat) Certificate of Merit. Each year only a handful of individuals are found worthy of this recognition. BGen Fischer presented the actual certificate at a special DLAEEM coffee break in December.

Ron Charron, ex CWO, is the LCMM for optics and instruments. I am sure every FCS Tech knows him or knows of him. The effects of his decisions are felt throughout the FCS maintenance world. Ron looks after nearly all the army's day optics except those which are system managed. This includes sights, observation devices and survey equipment, all with their associated test equipment. Also on the list are compasses, field photocopyers, time instruments, and assorted other pieces of kit.

"Performance at an unusually high level over an extended period of time" is the official reason for Ron's selection for the award. During his seven years in the public service, he has kept on top of the bewildering array of in-service equipment and worked steadily on introducing new kit and doing modifications to keep up with technology, thereby increasing performance and maintainability of FCS fleets. A couple of big ones are the Artillery Survey Gyro Orienter (to replace the GAK 11), and the modification programme currently underway for RADNIS, the sight of the Cougar WFSV. Ron Charron works with an amazing intensity. He simultaneously handles work arriving by mail, by telephone, and in person. Surrounded by his meticulously ordered files, drawings, CFTOs, microfiche and yes, now even a computer, Ron produces answers to questions which stump everyone else. He has an astounding memory and frequently

reaches back many years to recall sources of supply and other vital information. His numerous friends in NDHQ and in the defence industry help smooth over the bureaucracy in which we work.

Ron Charron is an example to follow in the LCMM world. His colleagues congratulate him for this most-deserved formal recognition.



## 1992 Car Raffle Winner



The winner of the 1992 car raffle, Miss Eliza Paddon, gives a "thumbs up" to her new car.



Eliza Paddon, with her father Robert, accepts the keys to her new Pontiac Grand-Am from Colonel Walsh.



# Electrical and Mechanical Engineering Association News

by LCol A.R. McLaughlin, President

## Association Prizes and Competition Awards

Through the efforts of Maj(Ret) Don McKinlay, a successful awards program took place at CFSEME.

Framed certificates for "Best Student" on all 17 integrated reserve training courses were presented, and three plaques were presented to "incremental" instructors. The presentations were arranged through Capt Bill Thompson, SO Reserve Training, CFSEME.

Some of the awards were presented by the Colonel Commandant and others by Association members at course ending ceremonies.

The plan to give awards to the "Best Craftsman" in service battalion maintenance companies was also successfully initiated last year. This plan was centred around the Biannual Service Battalion Competition. During this competition, the inspection team collects maintenance company submissions for "Best Craftsman". From these submissions, an overall "Best Craftsman" would be selected for an award in the form of a plaque; other submissions would receive a certificate.

Due to financial restraints, only six service battalions were inspected, however, submissions were received from all maintenance coys. Certificates were sent to the battalions for presentations and an overall "Best Craftsman" was selected for presentation with a plaque.

## Highlights of the 47th Annual Conference of EME A in Longue Pointe, Oct 1992

For the first time in years, the Association met at a location other than the school. It is felt by the membership that the conference should take place in different locations provided costs

are not prohibitive. There were a number of positive benefits including increased visibility of the Association and the EME Branch.

Sixty-five delegates were in attendance with reserve units, chapters and full time organizations well represented. As an indication of branch



LCol Ron Gillespie, Commandant CFSEME and Maj (Ret) Al Adams, First Vice President of the LEME Association, present Sgt HD(Curly) Rowbotham with the LEME Association plaque for outstanding performance at CFSEME as an instructor in reserve integrated training, 1992.



support, the G4 Maint appointments were present from all four Land Force Areas as well as SSO Maint, LFC, the DGLEM, Colonel Commandant and members of the EME Senate.

A Total of six resolutions were approved at the AGM: four to be directed to the Conference of Defence Associations, one to Land Force Command and one to DGLEM.

As part of the council meeting on Friday, a seminar was conducted on "Implementation of EME Total Force Maintenance Companies". A member of the Ottawa Chapter, Col John Leggat, chaired this topical and interesting seminar. As D Reserves, Col Leggat was able to outline the strategic plan for the reserves and current initiatives including retirement allowances that will encourage the retention of reservists and award them for their service.

Other speakers presented sitreps on Total Force, role of the reserve component in Total Force, training standardization and recruiting. The seminar was concluded by a panel discussion to respond to points of discussion raised by attendees.

The seminar was extremely successful and provided an understandable framework for the future Total Force Maintenance Companies. For further seminar information, readers are encouraged to contact their local chapter. This information has been distributed to all Chapters along with the minutes of the Council and AGM.

### Membership

As previously reported, the goal for 1992 was 250; as of Dec31, 92, the estimated paid membership was 285. The goal for 1993 remains at 350.

While on the subject of membership, it should be noted that the payment of a unit annual representation fee does not constitute individual paid memberships for the unit EME officers. The individual dues for national membership are \$10/year. Chapters may add an amount to this annual fee to cover chapter operating costs.

EME officers, serving or retired, not close to a chapter are encouraged to belong as members at large by sending their particulars and \$10.00 to the Association Treasurer, LCol Bob Hilliard, 38 Raywood Drive, Don Mills, ON, K0K 2T0.

## 1RCHA Close Out The Maintenance Challenge

*By Capt Daniel G. Scuka  
Technical Adjutant,  
1RCHA, Lahr, Germany*

### Introduction

In September 1991, shortly after return from the fall practise camp in Grafenwohr Training Area, the Commanding Officer of 1 RCHA, LCol Jim Petryk, announced that the Regiment had been slated for close out and return to Canada as part of the 1992 CFE reductions. This announcement came as a surprise to none but the most hardened idealists; the Regiment had already disbanded its fourth gun battery (Z Bty) in APS '91. Any further reductions to the Army's presence in Europe would logically fall onto the artillery, as it is the arm that could best

be removed from in-theatre and still leave behind a viable fighting force based on tanks and infantry. Still, the mood was dark that day, and all members of the Royal Regiment were faced with the same sobering questions. What would happen to those soldiers presently in 1 RCHA? Where would all the equipment go? When would the first of us have to leave Europe? Combined with the possibilities that some soldiers might have to be compulsorily released, it is not too far wrong to say that morale took a nose-dive.

For the CSS personnel attached to the Regiment, it was clear that the challenges were just beginning. Not since the disbanding of the Black Watch, the Queen's Own Rifles and

the Fort Garry Horse in 1969-70, and the move from Northern Germany a generation ago, had any regular force Regiment planned its own demise. It was evident in September 91 that the lion's share of work to get the regiment packed up and moved to Canada would fall to the CSS personnel in the unit - the "reemies" and the "bin rats." This indeed has proven to be the case. This article aims to briefly detail some of the maintenance efforts that have happened so far, and to highlight some of the problems. Who knows? - it could happen to your unit next!

### The Maintenance Estimate

By the time the Regiment's principle staff officers had completed their

estimates, all concerned realised that closing down was going to be more than just a matter of sending a few gunners down to the RQMS stores to help with boxing kit or checking headlights on a bunch of vehicles before dispatching them off to the nearest railhead. The Regimental Reduction Plan (reflecting the 4 Brigade draft reduction order) eventually covered all of the following:

- Maintenance
- Training
- Supply
- Personnel
- Eqpt Storage
- Eqpt Handover & Shipping
- Budgeting
- NPF Shut-down
- NPP Disposal
- Ceremonial Plans/Pdes
- Infrastructure & Environment
- Documents & Pubs
- Set-Up of the Stationed Task Force (STF)

In formulating the maintenance estimate, myself and the ETQMS,

MWO Gord Campbell, found ourselves faced with a task that neither of us had done before. (If memory serves me well, I think Sgt-Maj Campbell responded: "Beats the hell outta me sir, but estimate writing sounds like officer stuff...") Nonetheless, it seemed that our estimate would be correct if it covered some or all of the following factors:

- Time
- Manpower Available
- Resources Available
- The Bde Plan
- Eqpt Types and Qty's
- Regt Trg Schedule
- Morale
- Expertise
- STF Bty Set-Up

Of course, right from the word go there were limitations that affected the above listed factors. The most important was the deadline by which all work had to be complete. Initially, Bde HQ either couldn't give us a firm date, or we were given several conflicting dates. Also, simply knowing the final deadline wasn't sufficient; we still had

to allocate time for the shut-down of our own maintenance buildings and such areas as the Tool Crib, SPSS, etc, and we didn't yet know when any of the tradesmen themselves were due to rotate. Based on the best information available, I settled on the 15th of August, 1992 as our maintenance end date; this has proven to be not too erroneous as the current deadline mandated from Bde HQ is 1 August 1992.

It was determined that we could get all of the equipment ready for return to Canada or allocation to the STF, using a three-phase plan. The 1st phase, October 1991 - February 1992, would cover the initial 30% of all Regimental holdings. The Ops O made this initial selection of kit based on the bare minimum that would be needed for the Spring Practise Camp planned for 10 - 24 February at Munster-Bergen Ranges. The 2nd phase, March - April 1992, would cover 50% of the Regimental holdings, and the final phase, May - June 1992, would cover all remaining kit. The months of June - July would also allow us time to shut-down our own garrison maintenance activities and to look after any items



*Cpl K Ritchie, B Battery, changing support arms on an M109. (Photos by WO Bob Summers)*



that for any reason (parts delays, rejection by pre-shipping inspectors, etc) were still on unit charge.

Surprisingly, the biggest difficulty once the planning process was complete was simply to compile listings of Regimental equipment. The MS-2 was still out of date, not yet reflecting the changes initiated when Z Bty was disbanded. However, after a great deal of research, a list was created that listed all CFR'd or serially numbered items in the unit. This list has been in daily use since by Ops staff, the RQMS staff, and we maintainers as well.

### So What Has To Be Done, Anyways?

Myself, the ETQMS and all the repair section heads spent the next while ploughing through CFTOs to determine exactly what work we would have to perform. As well, we had just finished preparing the Z Bty vehicles and equipment for preservation during the spring of 1991, and we were intimately familiar with the standards required for kit being preserved. This determination was made easier upon being (finally)

told from Bde HQ that all of our kit would be returned to Canada for redistribution throughout the army; hence our goal was simply to bring all items to S-Class condition. Granted, C-04-020-002/AG-000 gives a definition of what "S-Class" actually means, but every individual inspector always has his or her own version of what will constitute a pass on a CF 1134 or 1136 inspection. From this point on, I instructed MWO Campbell to liaise daily with the NCOs from 4 Svc Bn who would be doing the actual acceptance checks of our kit. (In fact, I also told him to "...buy them all lots of coffee whenever they come over and make sure they get invited to all the 1RCHA/EME smokers and beer calls..." Hey - we're all human...)

What it finally came down to for the technician on the floor or in the workshop was simply this:

- a. perform a complete CF 1134/36 inspection - or in the case of ancillary kit, perform the appropriate 1st level insp;
- b. order the parts for all outstanding repairs or A/B mods;

- c. put those parts on when they arrive and/or perform the mod;
- d. complete the paperwork; and,
- e. ask the ETQMS for the rest of the day off...

To many alert readers, this procedure will seem startlingly similar to what daily unit maintenance is all about (except one never gets to sub-para (e) above). So what's the difference now? Well, now, we really are trying to get **all** the repairs done, and **all** the A or B mods installed. To this end, the ETQMS has appointed WO Bob Summers (a pro vehicle mechanic from **way** back...) to act as our own internal Technical Inspector for all vehicles and components. The Weapons, FCS and Communications serjeants are acting as their own inspectors under the frequent supervision of the ETQMS. We have also set up regimental and battery - level maintenance assist teams manned by Gunners and Bombardiers attached for this entire effort. They have formed paint teams, steam-cleaning teams, lubrication teams and are working in the SPSS section. I would be remiss if I failed to point out that their efforts



*Gunners from B Battery preparing an M109 for final inspection.*



make all the difference in allowing us to turn-in equipment on time. It is damn cold steam-cleaning an M548 at 8 o'clock in the morning in Lahr in February...

### Centralised vs. Decentralised - How To Avoid An Endless Re-Organization

For those of you familiar with the RIA, you will understand that most of the EME pers are decentralised to the batteries. Given the extraordinary aim of the maintenance plan, I probably could have convinced the CO to let me re-organise all the technicians directly under the ETQMS, but I chose not to. Too often, we re-organise when faced with a new situation. Rather, the ETQMS and I decided to re-allocate the eqpt, as per the following table:

A Bty LMT	B Bty LMT	C Bty LMT	HQ Bty LAT
M548s (10)	Generators	Ittis (8)	Ittis (6)
M577 Comd Post Veh (2)	All Heaters (all types)	5 Tons (9) (all cargo)	1-1/4T (8) (various)
Motorcycles (2)	Form Regt Insp Team	M113 (9)	MLVW (8)

### Allocation Of Equipment Responsibility

This has proven to be a very workable situation, as each of the Bty LMTs (Light Maintenance Teams) has approximately equal manpower. Also, this system permits all the technicians

to pool parts in four locations. This is handy, as we had previously had parts for all vehicle types spread between four Btys. When each LAT emptied out their spare parts MLVW prior to turn-in, we could then concentrate all MLVW parts in HQ Bty work bays, 5 Ton parts in C Bty work bays, etc. The



Capt Scuka and all ranks of Maint Troop, 1 RCHA, present DM1000 to the LEME Colonel Commandant, Col Johnston for the Monument Fund.



weapons, FCS and communications repair sections are doing the same sort of shake-out, but each separately.

### Problems - Or "It Isn't The Obvious That'll Get Ya..."

As of this writing, the Regiment has yet to enter phase 2 - which will be the largest - with 50% of the equipment due for turn-in. I hope the solutions that have been found so far allow us a clear sail through to June. "What are some of the problems encountered thus far?" you ask keenly. Well, I'll mention a few below, in no particular order.

**Parts.** This really hasn't been a problem. Firstly, there are plenty of parts in Lahr at Base Supply. (Base provides all 1st line parts for 4 Bde units in garrison.) Secondly, I have found that when you direct your tradesmen (bless 'em all...) to clean out their spare parts trucks, and the backs of all the MRTs, and the shop lockers, and the back of the tool crib, and ... well, let's just say that parts have yet to be a problem, although it does seem that the CFSS is out of most M548 cab fittings.

**Tools.** It is surprising how much of both fast-moving C-Class items and pooled tools that you **don't** need to carry on. As long as each tech has his basic tool kit, everything seems to work. This has allowed us to start close-out of the Tool Crib early. It is also a good time to do a stock check -

eliminating the chances for losses and letting everyone know exactly what will have to be turned in (...everything...).

**Soldiers.** Despite my best laid plans, the maintainers continually want things like leave and to go on career courses, and they keep having compassionate problems that require them to return to Canada for weeks at a time. Several of them are on release, one is enjoying free R&Q in Edmonton until August and Bde has forgotten to cross us off their list of "units with maintainers available for taskings." The point here is that my maintenance plan (...just like any plan...) is subject to the foibles, follies and desires of the soldiers who must implement it. Luckily, the Career Managers seem to have placed everyone within 3 geographic time zones of where they want to go after 1 Aug, so morale is still pretty high. Oh,... I almost forget - four soldiers from Maint Tp wanted time off in January and February because their wives were delivering babies .... AHHHGGGGG!

**Higher Headquarters.** I shall restrict myself to a few comments. Let's just say that no matter how well thought out and researched the question, no matter how urgently the response is required and no matter how hamstrung my maintenance plans may be without that answer, higher headquarters never, NEVER, EVER help (much). OK,...maybe that comment was a little too harsh - HQ does help a little. But just try and get a sensible answer as

to why a 1st level maintenance organization has to remove MPVBs from 5/4 ton trucks or why we have to bag and preserve small arms; both 2nd level functions...

### A View To The Future, Or "1 Aug, Here We Come.."

At the time of this writing (18 Feb 92), planning is under way for the start of phase 2. I expect that work will have picked up by the 4th of March, when the STF Bty equipment is separated out from the rest of the regiment, and we start maintenance preparations on all of our remaining vehicles. Undoubtedly, with the 5/4 ton fleet being disposed of in theatre and the 5 ton fleet being shipped to Canada for disposal, all the units that are closing out this year in Lahr will have an easier time. There is no doubt that every soldier working in Europe who wears the horse forcene cap badge is earning his or her pay this year, and then some. The NCOs and soldiers from 1 RCHA have done a tremendous job; my hat's off to you all.

### ARTE ET MARTE

*Editor's Note: This article was written during the close-out of 1 RCHA; the process described is now completed. Capt Dan Scuka is now a staff officer in NDHQ/DLES, and is the inspiration for a new EME Journal feature this issue (see page 40). MWO Campbell is now a CWO and working in NDHQ/DSVEM.*



# 203 Workshop ???

by Captain Scott Fuller

Ever wonder what REALLY GOES ON in NDHQ Project Offices??? Caught in the act in his mobile 203 WORKSHOP paint booth is Lieutenant Colonel Bill Tait by a crafty camera-carrying Captain. The ILS Man-

ager of the Project Management Office Light Armoured Vehicle, LCol Tait was recently discovered in limited production of the prototype model of the soon-to-be-acquired LAV 25. Diligently, he overcame the limited first-level drawings and, in a burst of

speed seldom seen exerted by Lieutenant-Colonels, he adapted the basic model kit to Canadian standards and was soon seen in a heated technical discussion on CARC and SCAPP paint policies with the PMO's Senior Materials Technician! The resulting model will become the focal point of many a PMO meeting as the Lynx replacement Light Armoured Vehicle Project proceeds.

The mobile paint booth, part of LCol Tait's newly-established 203 Workshop Depot, has been returned to its original configuration as a BOX, CARDBOARD, REUSABLE. The brushes and paints mark-time in the ILSM cabinet, awaiting settlement of the LAV CARC and SCAPP issues. The SWEATER, COMBAT, GREEN has undergone a reconditioning by an ingenious HOUSEWIFE, EACH, ONE, well used to the applications of EME brain-power!!!!



## Collaborative Research Into Small Arms Technology (CRISAT)

Between 1977 and 1980 Canada participated in the NATO Small Arms Trial held in Hammelburg, Germany and Shilo, Manitoba. The primary aim of the trial was to select, through direct competition, a rifle, a light machine gun, and a medium machine gun which it was hoped would become standard issue throughout NATO.

The lack of standardization is most evident in the proliferation of small arms which exists within NATO today.

A quick review reveals that NATO armies currently operate some 93 different small arms (pistols, rifles, machine guns, and grenade launchers) firing eight types of ammunition.

In spite of this profusion of competing weapons, the need to standardize and to increase interoperability are still well-recognized and much-publicized goals within NATO. These goals are gaining increasing impetus as shrinking defence budgets and struggling defence industries are obviously with

us to stay. From long experience NATO now realises that to play a role in equipment acquisition it must get ahead of the typical Research, Development, and Procurement cycle.

For exactly this reason the NATO Army Armaments Group (NAAG) Panel III (Close Combat Infantry) established a Sub-Panel entitled the Programme for Collaborative Research Into Small Arms Technology (CRISAT). CRISAT is a three-year research project involving nine countries which started work



in late 1990. The efforts of the programme are centred around seven Technology Area teams: target definition, terminal effects, target acquisition, materials, propulsion, electronics, and evaluation. CRISAT has been given the task of "enabling future weapon systems to benefit from available advances in technology at minimum cost". The current NATO definition of the term small arm is a "portable direct fire Individual or Crew Served Weapon Used Primarily in the Anti-personnel Role", which include all direct fire weapons under 50mm, and includes a secondary capability to defeat light armour and helicopters.

Within this very broad mandate there are two specific ways CRISAT can influence the future of small arms. The first is to establish agreed NATO standards for future weapons. Once approved, these new standards will take the form of NATO Standardization Agreements (STANAGS). The benefit of establishing standards is that nations and industry will know the minimum capability required before detailed R&D programmes even commence.

The second way CRISAT can assist NATO is by conducting broad based research into future technologies to determine possible applications for future small arms. Essentially this will become a catalogue of technologies which will let national equipment procurement staffs know what research is being done that may have small arms application. CRISAT should also point out to industry the necessity and advantage of forming international consortiums capable of producing a revolutionary new generation of small arms. It is unlikely any one company could build the small arm of the future. The formation of international consortiums specializing in one or more categories of small arms should also reduce considerably the number of competing small arms natures on the NATO market.

The weapon that the future "storm trooper" will likely carry could eventually evolve from the CRISAT programme. The weapons will be short, rugged, and lightweight. It will be mounted with a day/night/obscuration defeating sight possibly slaved by fibre optics to a Head Up Display in

the soldier's helmet. The weapon itself will be of modular construction with interoperability between the Individual Combat Weapon and Support Weapon in terms of sights, firing mechanisms, computers, sight mounts, and standard connections for add ons such as grenade launchers or laser rifles.

Finally, it is necessary to put CRISAT into perspective. Small arms are indeed a minor requirement in terms of overall defence spending; however, they are numerous and highly visible and are required by every country irrespective of size. Therefore, any successful collaboration and movement towards increased standardization in this area must be viewed as a step in the right direction.

( A precis of an article written by: LCol G.W. Nordick, Chairman for the Programme of Collaborative Research Into Small Arms Technology (CRISAT), dated 30 Aug 91.)

## Craftsman Rebuilds MLVW!

Tragedy struck 2 RCHA when a Medium Logistic Vehicle Wheeled (MLVW) full of soldiers slid on a patch of ice and rolled on the way to the Petersville Training Area. Fortunately no one was killed and the conduct of the emergency response elements was commendable.

One of the emergency elements was a recovery vehicle from Base Maintenance Company, and its crew assisted in the evacuation of the casualties. After the initial investigation was completed the MLVW was recovered and placed in quarantine. After the lifting of the quarantine a repair cost estimate was conducted. Through a

detailed inspection of the MLVW and reference to microfiche and Canadian Forces Technical Orders (CFTO) it was determined by the Inspection and Parts Cells that the repair costs would be approximately \$13,633.49. The cost was definitely beyond Gagetown's authority, and permission was thus sought from Directorate Support Vehicle Engineering and Maintenance (DSVEM), NDHQ's vehicle authority, on whether or not to repair the MLVW. Gagetown's repair responsibility is for first, second, and very limited third line repairs, and its facilities reflect this. Obviously the repairs required to the MLVW were beyond Gagetown's mandate; there-

fore a decision as to where the MLVW was to be repaired had to be made by DSVEM. Authorization for Gagetown to begin the repairs was issued, and the ordering of 164 replacement parts commenced.

Because of the detailed estimate conducted by Base Maintenance Company personnel, a revision of the initial parts estimate was not required. When the majority of the parts were issued from Supply a decision as to who would actually do the repairs had to be made. Base Maintenance Company has a highly respected OJT 4 Vehicle Technician program in place, and it was decided



that Pte Boudreault, a QL 3 Vehicle Technician on his OJT 4 training, would conduct all the necessary repairs on the MLVW.

Pte Boudreault started the project by stripping the MLVW of all components above the frame. His rebuilding started with wiring the new drivers cab using CFTOs and the ruined cab as references. Pte Boudreault carried on this practice using all resources available to him to complete the repairs properly. Assistance was given by numerous sections of the Company including: Miscellaneous in the repair of the Air Pack and master cylinder; Electrical in repairing the alternator; and Contracts in acquiring the special tools required by Pte Boudreault. Numerous parts that were required for the MLVW were not readily available in the

system, therefore a great deal of motivation and modifications were required. For instance, a passenger door for the MLVW was not available so a door off of a five ton was used. The total parts cost of repairing the MLVW was \$12,256.43. Pte Boudreault completed the rebuild project in 59 days.

Pte Boudreault drove the completed MLVW out of Base Maintenance Company lines thus winning a beer from the Workshop Operations Officer, and marking the end of the

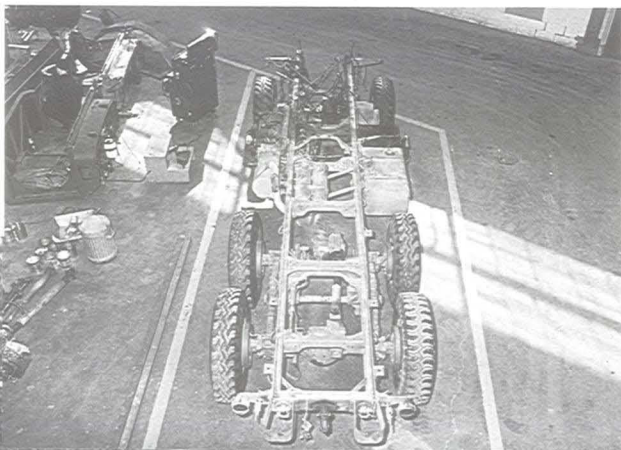
2 RCHA saga. A total of seven different agencies inside Base Maintenance Company took part in the reconstruction of the MLVW; however, the key player was Pte Boudreault. A total of 186.5 manhours were used in the actual repairing of the MLVW, of which Pte Boudreault contributed 179 hours. The total cost of repairing the MLVW came to \$19,520. 61.

Bravo Zulu to all of Base Maintenance Company personnel who had any involvement in bringing about the saving of the MLVW. Special com-

mendation has to be given to Pte Boudreault who literally built the MLVW from scratch. Yes, Canada's craftsmen do still exist; Pte Boudreault is a fine example of one.

*Editor's Note: Pte Boudreault is now a Cpl and working at CFSEME.*

*MLVW, CFR 82-61032, belonging to E Battery, 2 RCHA, shown disassembled prior to complete rebuild by Base Maintenance Company.*



*Pte Boudreault, a QL 3 Vehicle Technician from Base Maintenance Company Gagetown, proudly displays the final product of the rebuild of MLVW.*



# The Day the Gemini Arrived

by Major Al Howard, LETE

A world first occurred at the Land Engineering Test Establishment (LETE) in Ottawa on the 23rd of April 1992. On this day LETE took delivery of a brand new transmission known as the Gemini, designed specifically for the latest model M113A3 armoured personnel carrier. The Gemini has 64 speeds in both forward and reverse. Each gear change results in a speed change of less than 5%, such that the transmission is virtually continuously variable. This is the first high efficiency, continuously variable transmission ever made in the world that is suitable for large vehicles. It is also the first vehicle transmission to be designed and built in Canada. And in

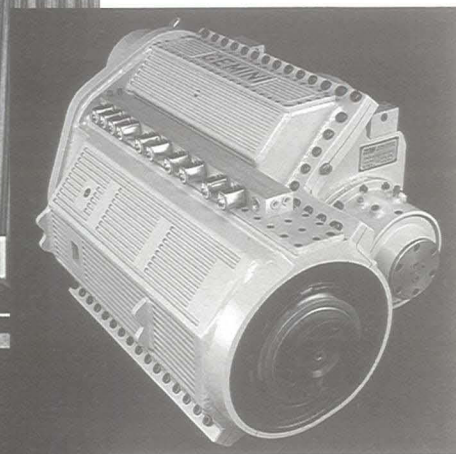
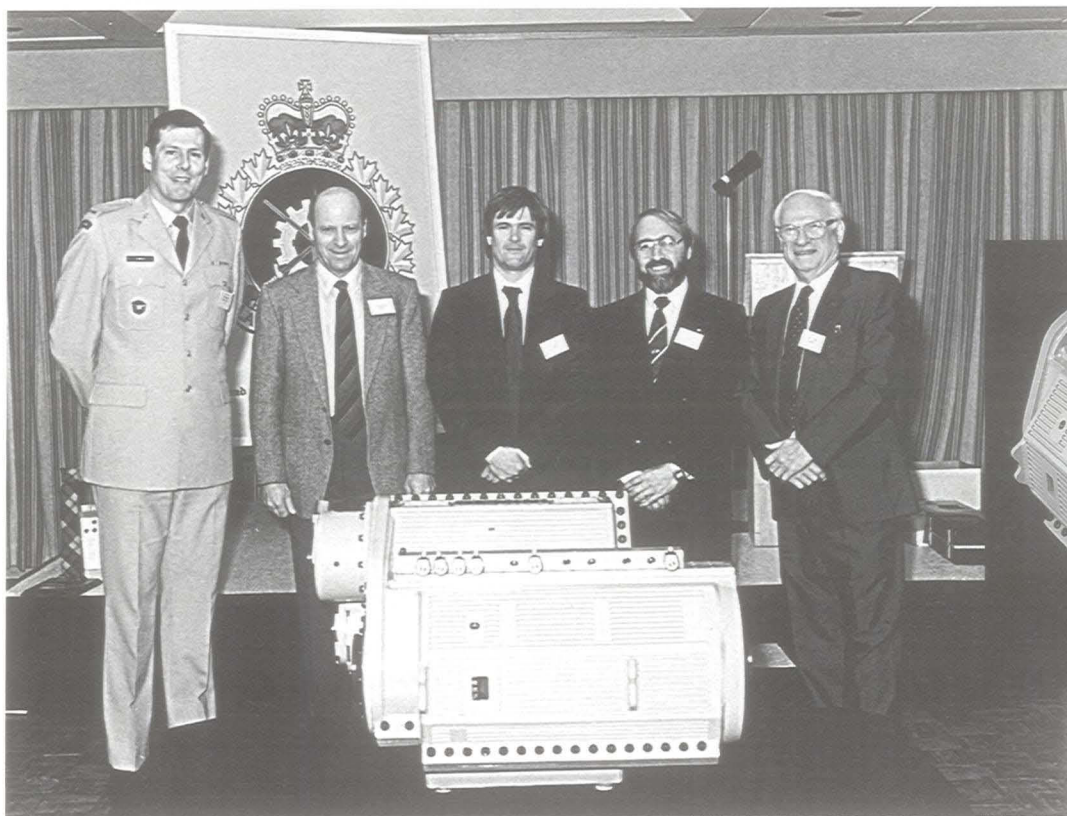
this EME Journal exclusive story, you are the first to read about it!

What makes the Gemini unique is that it has an all-gear design, like a manual transmission, yet it is totally automatic, without a torque converter. It is controlled by a micro-processor and employs binary logic switching within three four-speed stages that are arranged in series, giving  $4 \times 4 \times 4 = 64$  total speeds. With no torque converter, this transmission can enable safe and easy tow starting of the APC and make maximum use of engine braking. But the real benefits are high efficiency operation with optimization for fuel economy and performance in all driving conditions.

The attraction of continuously variable transmissions (CVT's) is that they can produce a continuous range of output speeds with a constant input speed, as compared to conventional manual and automatic transmissions which provide only a few discrete ratios. In this way perfect engine/transmission matching can be achieved for all load and going conditions, with no power interruption during gear changes.

CVT's have been around since the Fouillaron automobile in France first introduced them in production in 1900. Its transmission used perhaps the simplest of all CVT's, a variable diameter pulley and V belt system. Here the driving pulley effectively gets larger while the driven one gets

smaller (but in the same proportion, to keep the belt tight), as vehicle speed increases. DAF of Holland offered a small car with this arrangement from 1956 until just a few years ago and the



*The Gemini Transmission.*

From left to right are: Maj Al Howard - DND Project Manager, Mr Errol Wallingford - Computer Consultant, Mr Mitch Kerr - Ker-Train Systems Ltd, Mr Ernie O'Neill - DND Project Sponsor, and Mr Hugh Kerr - Inventor and President of Ker-Train Systems Ltd. (Photos: Cpl M. Durand, LETE Photo Section)

same system is widely used in today's snowmobiles. The latest CVT on the market is the Van Doorne transmission. It also employs the variable pulley principle but using a newly developed metal V belt technology that operates in compression rather than tension. It actually pushes the driven pulley but is currently limited to vehicles of less than about 100 hp.

With conventional manual transmissions and to a large degree with automatic transmissions, vehicle speed and engine speed are directly related by the transmission gear ratio. To accelerate a vehicle from rest, the driver starts out in a low gear, increases engine speed to somewhere near maximum, changes gears and increases engine speed again. To adjust vehicle speed to traffic conditions, the driver modifies the engine speed. With a CVT however, engine speed and vehicle speed are independent. You could experience the novel sensation, for example, of smoothly pulling away from an intersection while engine speed remained constant, at say 1500 rpm. The Gemini also has a wide ratio range of more than 20:1 to 1:1, but with this shifted slightly to provide overdrive capability up to 0.867:1 in top gear. In comparison, the equivalent overall ratio of the M113A2 in first gear is only 9.18:1 (at torque converter stall).

Manual transmissions typically transfer rated full power at an efficiency in the high ninety percent range, say 95 to 97%. Passenger car automatic transmissions do not exceed the mid eighty percent range. When one of

the world's modern main battle tanks with a 1200 hp diesel engine only manages to get 900 hp out of the transmission to move the tank, you can begin to appreciate the efficiency question. The Gemini is untested as yet, but a full load efficiency approaching 90% is expected. Efficiency relates to fuel consumption, which is of considerable logistical interest to an army in the field. It also impacts on cooling system requirements. As a CVT, the Gemini provides a further fuel economy benefit, by permitting engine operation at speeds of minimum specific fuel consumption for the power demanded, since engine speed is not dictated by the desired vehicle speed.

Tracked vehicle transmissions provide not only a gear changing function, but must also steer their vehicles. This makes them complex, large and expensive in proportion to their degree of steering sophistication. The M113A1 and A2 familiar to us have a steering differential that essentially provides one turn radius with the tiller bar fully applied, regardless of forward speed. By feathering the tiller bar, a larger turn radius can be defined. Since in the latter case the inside track is not geared down but rather slowed by a friction brake, some loss of power occurs. Unlike any other military tracked vehicle transmission, just by turning the steering wheel the Gemini provides an automatic progression from large turn radii to smaller ones, then to pivot turns with the inside track stopped and finally to axis turns where the tracks counter-rotate. These steering functions are

all obtained directly and precisely by appropriate transmission gearing with its associated high efficiency. Incidentally, no transmission cooler is anticipated to be required in the Gemini-equipped M113.

The Gemini concept is applicable to any high speed tracked vehicle, including main battle tanks. The M113 was arbitrarily chosen as a test bed to evaluate the technology. LETE is in the process of installing the transmission in an A3 model APC where the engine faces the rear of the vehicle. This is ideal because the Gemini replaces the existing transfer case, transmission, torque converter and steering differential with a single unit that attaches directly to the engine flywheel housing. A test program will follow to evaluate performance against the claims made by the inventor.

The Gemini was developed for DND under a research program funded largely by the Chief of Research and Development (CRAD). From the beginning, it has been very much an EME Branch project, involving personnel in various DGLEM Directorates and Project Offices. The inventor is Mr Hugh Kerr from Kingston, Ontario, an ex Air Force aeronautical engineer and former WW II Spitfire pilot. You may soon have an opportunity to experience his binary logic CVT's for yourself, for the commercial automotive world is now knocking at Mr Kerr's door.

*Editor's Note: Maj Howard now works at RMC Kingston.*



# Nail It and Turn Left!

by Sgt M.H.J. Palmer

At one time or another we have all dreamed of racing cars. Indy cars, NASCAR, CASCAR, rally cars, dragsters, sprint cars and other classes of car racing have been around for many years. However, for three FCS Techs from CFSEME Artisan Company, the preferred form of racing is the Street Stock class at Barrie Speedway.

Last year we raced a 1979 Chevrolet Caprice Classic, the # 75 "Silver Bullet". Although we didn't win any races, we gained valuable information and learned that there is more to stock car racing than what is implied by the title of this article. After an intimate (and unfortunate) encounter with the wall in corner # 2 during the last race of the '92 season, it was decided that a new and improved car would be built for this season. It was also decided to pursue corporate sponsorship to ease some of the financial burdens that occur during the race season.

Although the Street Stock class is an entry level, low budget series you would be amazed at how fast the bills pile up.

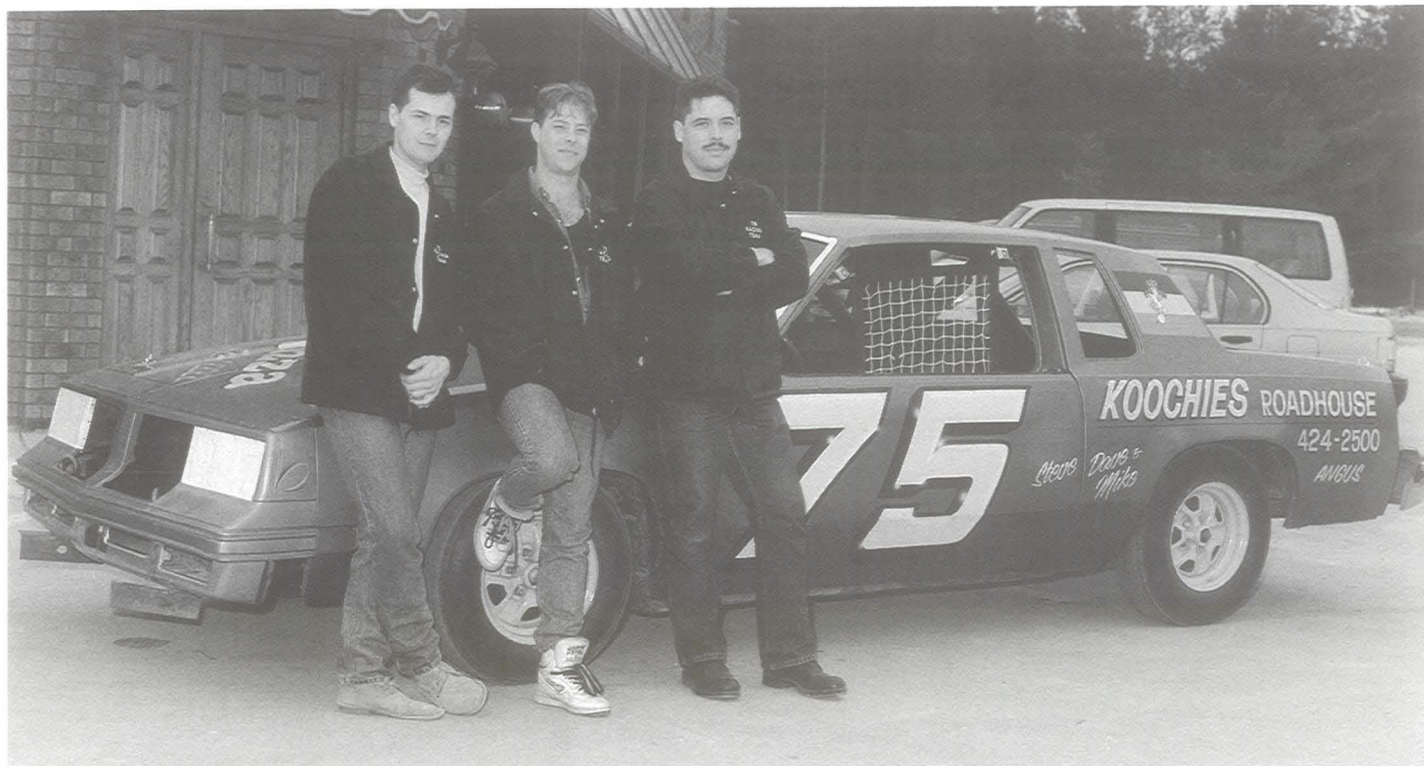
Well, race fans, we did it! This year's car is the new # 75 Koochies Kwicksies Cutlass - the nastiest, fastest, most brutal car in it's class! Powered by a Chev 350cid V-8 (tuned to combat racing specs) and sporting an eye-catching paint scheme (including the EME/GEM crest and colours), this car is going to be a serious contender in the '93 racing season. Many long nights were spent wrenching, welding, painting, modifying, and replacing components using our knowledge gained from last year and the expertise of our team and contributors. We think the end result is worth the blood, sweat, tears, and money that went into this 1981 Oldsmobile Cutlass Supreme.

We could not have accomplished our objective without the assistance of the staff and students of CFSEME. Many

thanks to RSM CWO Clough, MCpl Jeff Smith, Cpl Darren Daley, MCpl Butch Airman, Cfn Joe Tomkins, Cpl Wayne Whelan, Cfn Dave Davies, and everyone else who donated their time and effort. We also were fortunate enough to find corporate sponsors who coughed up funds for a car that only existed in our minds at the time we approached them: Koochies Roadhouse, Koochies Pizza, George's Furniture, Edward's Home Entertainment, Dey's Auto Glass and HL Auto Parts (all from Angus, Ontario).

On behalf of the team (Steve Herscheid - driver, Dave Krantz - driver and myself, Mike Palmer - crew chief), we hope to see you at the track some time. Hopefully by the time you read this we will have brought the EME/GEM colours first across the finish line!

*Editor's Note: Sgt Palmer retired on FRP since writing this article.*





# Leopard Chassis News

by Maj Kevin Kennely

## Recent Test and Trials

Although there may currently be a moratorium on improvements to the Leopard tank fleet, we here in Ottawa have been busy conducting a number of tests and trials for the Leopard tank and its family of vehicles. Our work with the F34 Single Fuel Concept, and explosion suppression in fuel cells, should be of interest to many readers of the EME Journal.

## F34 Fuel

Canada has made a commitment to adopt the NATO Single Fuel Concept (SFC) which means all combat vehicles in the forward echelons will eventually operate on one fuel, F34. F34 is essentially Jet A1 fuel with a number of additives. Canada also agreed to participate with our NATO allies in testing programs to assess the implications of this policy and NDHQ equipment LCMMs were required to determine whether their respective fleets could operate on this fuel.

The Leopard engine was originally designed as a multi-fuel engine; however, until now there has been no real intent of running it on anything other than diesel fuel. During the initial stages of SFC testing the German Army conducted a series of performance-oriented tests using a standard Leopard 1. Their tests were aimed at determining whether there were any discernable performance short-comings in using one fuel over the other. These tests showed there was a measurable power loss which was assessed as having no serious affect on vehicle performance.

The results and conclusions of the German trial posed a problem for us. Canadian Leopards, unlike those of any other Leopard User Nation, have been modified to accept mine ploughs and mine rollers; would the power loss observed by the German Army have any further affect on us?

It was decided to conduct a test with the LETE Leopard in the following configurations:

- Combat loaded;
- Combat loaded with simulated additional armour;
- Combat loaded with the mine roller system;
- Combat loaded with the mine roller system and the simulated additional armour package; and,
- Combat loaded with the track width mine plough.

The German series of tests were used as the basis for the LETE tests so that results could be compared. These tests included:

- a 300 meter dash;
- a maximum speed test;
- a pivot turn test;
- acceleration up and ability to start on a slope;
- a cross-country course; and
- mine ploughing operations.

Concurrently with the tests at LETE, 202 Workshop Depot tested the performance of one engine on their engine dynamometer. The essential result of this test was a measured maximum power loss of approximately 4.5%, a result which was in line with those obtained by other NATO countries on other engine tests.

The end result of both tests confirmed that the Leopard engine can run with either type of fuel with overall vehicle performance described as:

- minimal to negligible performance degradation experienced when using F34 fuel in lieu of the regular diesel with any of the Canadian vehicle configurations (including that of additional armour).
- power pack operating temperatures are higher with F34 fuel; this would not pose a problem in temperate areas but might pose a problem in very hot ambient temperatures.
- less exhaust smoke is produced with F34.

This evaluation did not investigate the effect of F34 fuel on engine wear. However, Norway has been operating their complete Leopard 1 fleet on F34 for over one year without problems.

In summary, the Leopard C1 has been certified for operation with F34 in temperate climates.

## Explosion Suppression for Fuel Cells

A field driving trial and a firing trial have been conducted at CFB Gagetown to determine which materials would be best to suppress an explosion inside the fuel cell of a Leopard MBT when a main round hit the Power Pack compartment.

Aluminum foil (similar to Explosafe) and safety foam, in the shape of small balls, were placed inside the fuel cells. After the completion of the driving trial portion, the aluminum foil was found to be unsuitable as the material



settled leaving a gap of approximately 10 inches inside the fuel cell. In the case of the safety foam, no problems occurred during the trial period and the material remained as originally placed.

During the live firing trail, the impact created more damage to the fuel cell

filled with aluminum foil, and a greater time was required to extinguish the fire, as opposed to the cell filled with safety foam.

As a result of these trials, DCMEM intends to modify the fuel cells of the complete Leopard fleet with a safety foam material, starting with the MBT.

*Editor's Note: Maj Kennely has left the Canadian Forces and is currently undergoing training as an officer in the Salvation Army in Toronto.*

## Maintaining the Standards

*By Captain C.S. Carter, CFSEME TDO*

I'm sure many of you have wondered if the whole lot of us here at CFSEME are on POT. Now that you mention it, we are... Performance Oriented Training, that is. Performance-based training is neither a new nor radical concept. It involves the provision of training that matches true job requirements. Excessive training is a waste of time and money. In today's world of shrinking defence dollars, training is being targeted as an area where great savings can be realized. Sounds good, but how do we do this? The simplest solution is to provide only the training that is really needed on the job. The "nice-to-have" training is a luxury that can no longer be afforded.

A word to the wary - nothing is being taken away from any of the 400 series trades. All necessary training (skill and knowledge) will be provided, and only the frills will be stripped away. Frills, what frills? These are areas of training that are not actually used on the job, or are used by so few technicians that it is not worth training everyone how to perform them. For example, why spend days teaching Engine Precision Rebuild (EPR) to all MOCs when only one or two techs are actually involved in doing this? Why spend 60 hours of Wpn Tech QL3 training time on designing and building advanced hydraulic systems?

This is a skill that is obviously not required of a QL3. Does it make sense to teach QL3s math, chemistry or physics that is so advanced that the QL6 and QL7 instructors can't keep up? To balance this, there are obviously the "needs of the Branch" to be considered. The same Veh Tech who may never hone a cylinder will learn a great deal about the functioning of an engine while rebuilding it.

Do you remember the favourite questions of the average high school student? "Why are we learning this... where or when am I ever going to use this?" The constraints of the real world are forcing the training system to ask the same questions. Training must match the requirement of the trade. Nothing more, nothing less. This is a real world decision based on the incredible cost of training and the actual needs of the users.

How do we trim the fat? The most recent occupation to undergo a review was that of the Weapons Techs. All aspects of training were reviewed, documentation was "cleaned up" and CTS amendments were recommended to CFTSHQ. Very little training was eliminated, but the remaining material was aligned with the Specifications to reflect what was required on the job. This is the beginning of performance based training.

Why are we (CFSEME Standards) doing this now? The move towards performance-based training has been demanded by CFTSHQ for many years. Implementation is not something that can happen overnight. Due to the move towards financial accountability and shrinking training budgets, the old way of training can no longer be justified. We are faced with the prospect of producing the same number of students at a lower cost. This may involve cutting non-essential training, hiring more civilians and/or more efficient utilization of school resources.

Whatever the outcome of the next few years, be assured that the concerns of all tradesmen are being considered. Training will change, and it will change for the better. Our only concern at the school is being able to produce quality technicians in the most efficient manner.

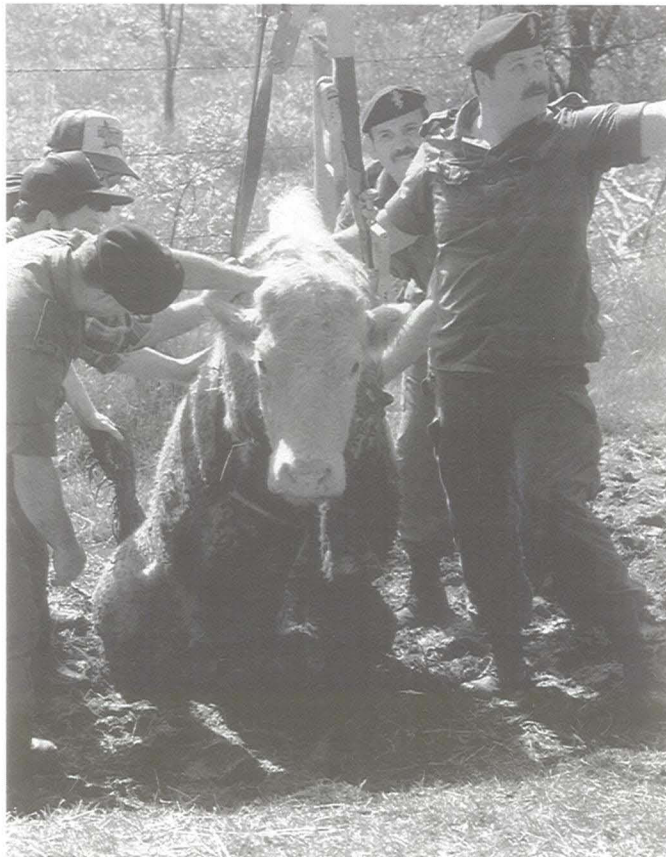
*Editor's Note: Capt Carter is now a major and the Command TDO for LFC.*



# A Moooving Tale



*Bluebell watches the ARVL approach*



*Cpl JEC Dallaire, MCpl DJ Hale, and MCpl BB MacNeil begin to lift Bluebell, who looks tremendously impressed with the whole process. Also shown are veterinarians who were present to sedate Bluebell and ensure she was properly harnessed.*

*Originally printed in the Borden Citizen but edited for the EME Journal by Capt D.J.J. Hébert*

*Photos by Pte Carole Jodoin*

Four men from Base Maintenance in Borden had an unusual task on 2 June 92 - they rescued a cow.

The story began about three weeks earlier when the OPP were investigating cruelty charges against an area cattle owner. As a result, they came across a pregnant cow with injuries to both her hind legs. She was collapsed in a swampy area near Beeton, Ontario, just south of Alliston. When she was found she was signed over to the care of Rick Foley of the Alliston and District Humane Society.

Mr. Foley brought in veterinarians to examine the cow. It was decided that the only way to possibly help her was to induce labour. It was hoped that after the birth of the calf, the mother, about 150 lbs lighter, would stand. The healthy calf was taken into care by Pete and Kathy Nesbitt, local farmers. Volunteers camped out with the mother, keeping her warm, safe and fed. She stood a few times but not for long. By Saturday, the situation was getting desperate.

"The vets told us she wouldn't survive if we didn't get her out of the bog", said Mr. Foley, "and that she had a chance of survival if we could get her to a farm."

Several local farmers tried to help with trucks and tractors, but no one could access the area, or lift the cow.

"At one point", said Mr. Foley, "someone said, 'too bad we don't have a helicopter'. Someone else added jokingly, 'why don't we call out the army.' I thought maybe we'd found the answer.



Mr. Foley said he called Base Headquarters wondering at the response he was going to get for his unusual request. "Capt Ogilvie, the Executive Assistant to the Base Commander, took me seriously right from the beginning."

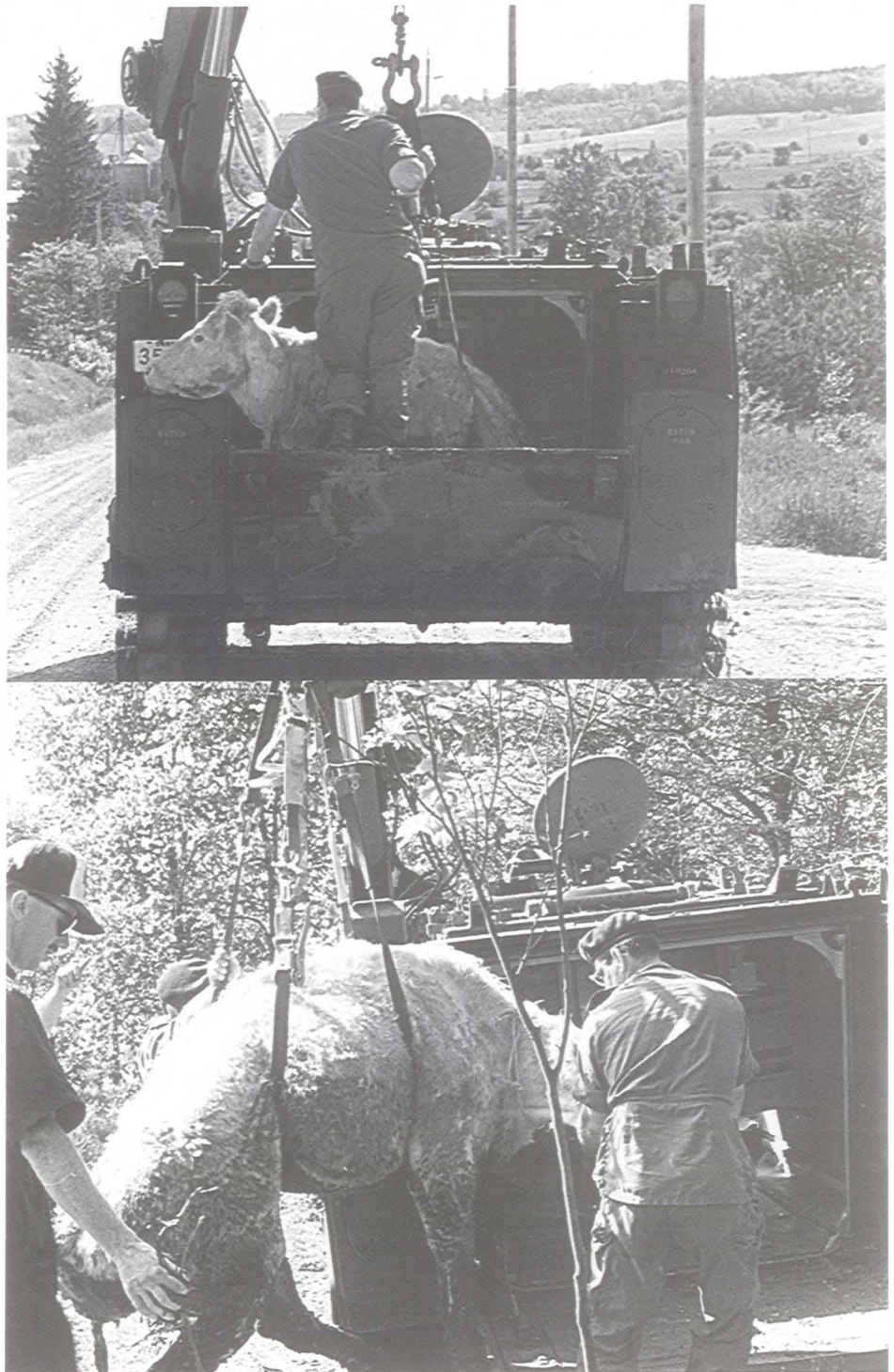
The Recovery Request was passed from the Base Commander's office to the BTSO and finally to the B Maint O. That is how MCpl Brian MacNeil, MCpl Doug Hale, Cpl Christian Dallaire, and Mr. Russ Perry found themselves using an APC Fitter to rescue a cow on that Tuesday in June.

"They were wonderful with her," said Mr. Foley, "I can't thank them or the General (BGen Tousignant) enough. If they hadn't come through the cow would have had to be put down."

"I've lived in this area for 10 years, I've seen the army around, but I've never been to Borden and I never thought much about them. Seeing how fast they came to help, that they care about the people, has made me really proud. I've never owned a Canadian flag but I think I'm going to get one now. What they did will be remembered for a very long time by everyone involved."

The four rescuers were given the honour of naming the cow. They decided on Bluebell. Bluebell has joined her calf at the Nesbitt farm and is now recovering beautifully. She's eating and getting stronger every day.

This one must be included in the Recovery Hall of Fame.



*Bluebell is lifted out of the mud and given a chauffeur-driven ride to safer grounds near the stable.*

# An EME Workshop in Air Command

## Base Electrical and Mechanical Engineering Section CFB Edmonton

By Capt S.W.J. Roberts

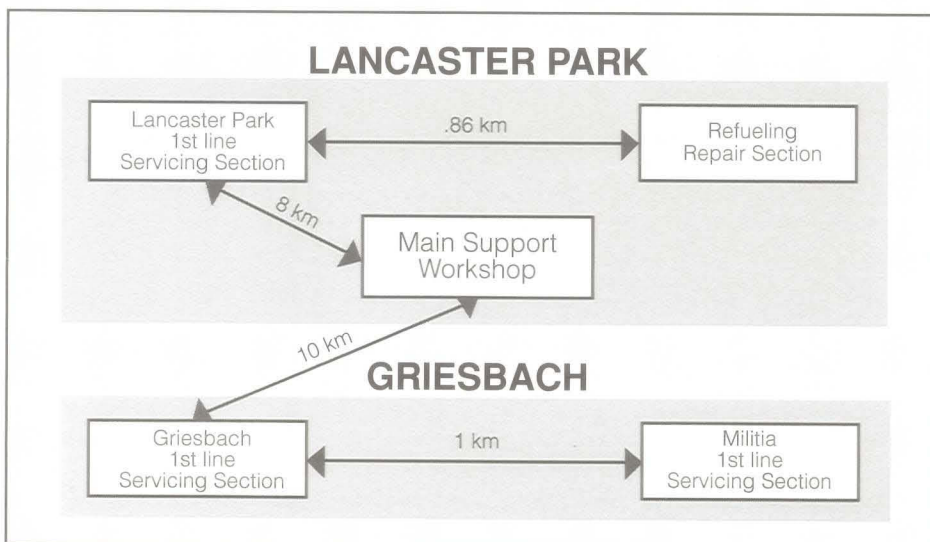
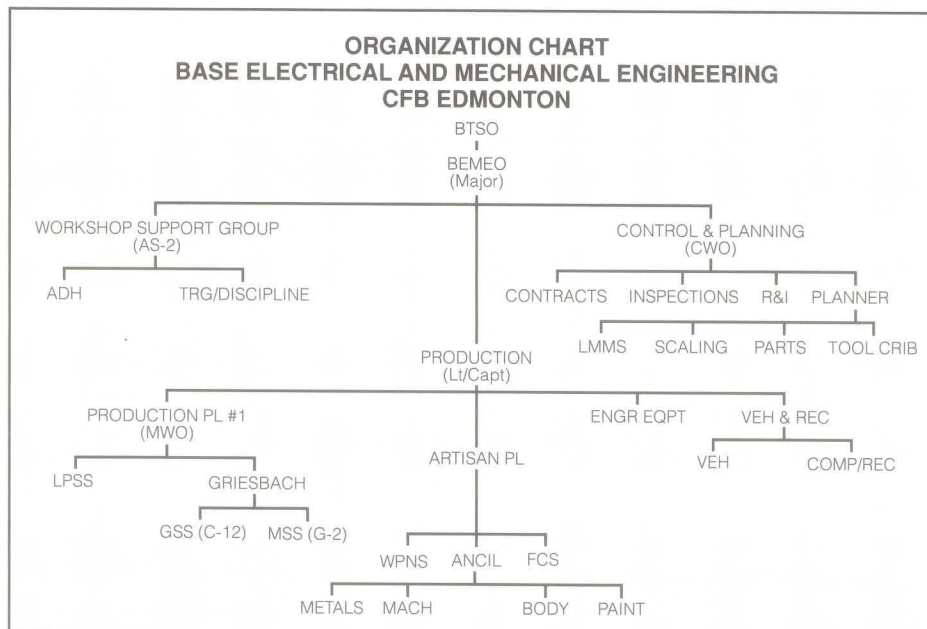
Is there such thing as a typical EME Workshop? Some might argue that there is; however, if an air base is laid out in its own unique fashion, does it not also stand to reason that the maintenance facilities would follow suit?

CFB Edmonton, for example, is broken into two areas located ten kilometres apart, one at Lancaster Park (outside the city) and the other at Griesbach (inside the city). Here at CFB Edmonton, the BEME Workshop is required to employ EME tenant one - "Repair as far forward as possible to the maximum extent feasible." This is accomplished by placing our first line repair facilities as close to the action as possible.

The following is a diagram depicting the facilities and their distances from the main support workshop. It can be seen from the diagram that the first line organizations are located a considerable distance from the main workshop but are located extremely close to the customers where they are actually required.

The Workshop has a total strength of 83 personnel of whom 25 are civilians. It is basically structured in accordance with our bible, B-BL-314-006/AM-001 *Static Operations*, and consists of the usual maintenance and repair facilities one would normally expect to find in a workshop except for one slight aberration. This workshop has no Tels section, as the function is assigned in its entirety to the B Tel O.

The organization is divided into three major sections: Workshop Support, Control and Planning, and Production. The Production Section is further subdivided into two platoons and two sub-sections. The line diagram of the organization is depicted in the following diagram:



The Workshop Support and Control and Planning sections functions as one would expect in a standard workshop. As you read on, however, you will note that the units this workshop supports are located over an extremely wide area (Northern Alberta/British Columbia, Yukon and Northwest Territories) and operate a wide variety of equipment. This includes, incidently, a significant variety of boats (small ships). Consequently, a considerable amount of liaison and administration with units, often involving two and three different command structures, can be required to carry out the simplest of tasks.



Without doubt, the Workshop Support and Control and Planning functions are crucial to the successful operation of this workshop.

As a whole, BEME Edmonton provides support to over 80 cadet units, 9 militia units and 16 integral and lodger units. The second-line repair facility at BEME provides the normal support to its first line units, which ranges from the repair of snow removal and roads/grounds care equipment to weapons, standard military and commercial pattern vehicles. A special point to note is that BEME Edmonton provides direct support to 7 Canadian Forces Supply Depot which encompasses all in- and out- inspections as well as preservation and depreservation.

BEME sections at first-line units provide direct support to the militia who control and operate over 120 vehicles plus associated trailers and generators. At Griesbach they service over 130 vehicles for the Regular Force, ranging from police cars to roads and ground equipment. At Lancaster Park service support to airfield operations involves some 181 vehicles, including refuellers and other base equipment.

To add further to the decentralization and diversity of the workshop, the maintenance organization of the Detachment Penhold recently became an added responsibility. The Det consists of four vehicle technicians (including one civilian) and one weapons technician with the BEME Det Comd being a Sgt. Included in the package is the requirement to support two additional Cadet Corps and more militia units.

As one would expect, this workshop's primary mission is to provide EME services in support of airfield operations. Accordingly, the large number of priority equipment such as fire crash rescue vehicles, de-icers and aircraft tow tractors demand a constant high level of activity from our

technicians and administrative staff. The wide variety of equipments supported offer a world of experience to our technicians not normally available on other bases. Also, the insight gained as to how an Air Command

base goes about its daily business greatly enhances our technician's ability to provide EME services anywhere/anytime.

*ARTE ET MARTE/SIC ITUR AD  
ASTRA*



*MCpl Scott Helwig and Mr George Skinner discuss repairs to a boat motor.*



*Various pieces of equipment found on an air base: ground power unit, sweeper, grader, snowplow and Voodoo. Fortunately, BEME does not have maintenance responsibility for the Voodoo!*



# Champlain's Astrolabe at 202 Workshop Depot

by Capt N. Brely MktgO



The team that fabricated the reproduction of Champlain's astrolabe. (From L to R) MWO Yves Lesieur, Sgt Gerard Moulin, Gilles Ratté, Michel Allard, Alain Mirandette, Francois Brissette, Jacques Gauthier, Alain Champagne, Conrad Chevalier, Michel Hubert, Bernard Lebel, Pierre Larocque, Daniel Alphonso, and Serge St-Denis. Missing are Richard Radziszewski, Marcel Laroque, and Luc Pharand.



Jacques Gauthier and Alain Mirandette fabricate a portion of the astrolabe on an automatic machine.



Serge St-Denis and Michel Allard check the astrolabe against the computer specifications.



Richard Radziszewski compares the astrolabe with the drawings.

Last August, 202 Workshop Depot's craftsmen completed three reproductions of Samuel de Champlain's Astrolabe in order to commemorate the 50th anniversary of REME.

According to history, the Astrolabe is one of the earliest forms of navigational instruments, dating as far back as 170 BC. In the sixteenth century, a simplified seaman's version was used by explorers like Champlain in their voyages across oceans and continents. It was eventually replaced by the sextant.

Historical data also suggests that in the spring of 1613, on a mission to expand Canada's boundaries, Champlain, founder of Quebec, lost his Astrolabe while portaging through some very dense areas on his voyage up to the Ottawa River. The Astrolabe was later found in 1867 by a young farmer named Edward Lee. During the following century it changed owners and eventually, in 1989, ended up on display at the Canadian Museum of Civilization in Hull, Quebec, ironically returning very close to the area where it originally lay for over 250 years.

It was a great honour for 202 WD to undertake such a task, especially for those who were directly involved. These people used their utmost abilities and talents to reproduce an invaluable piece of Canadian folklore.

The Astrolabe's reproduction was done in three distinct phases. The conception was developed by an analyst from the engineering department. Using modern technology and specialized skills, he was able to reconstruct an engineering masterpiece of the past, working only from



pictures and a basic drawing. The data was then transferred into computer-aided programs so that, in the second phase, the components could be reproduced on sophisticated machine tools. At this stage tradesmen and machines worked together to give the Astrolabe its impressive shape. All demands and expectations were met, including the museum's demand to make the reproduction easily distinguishable from the original. To this end, the reproduction was made 5.6% smaller, and has the Museum's logo and insignia discretely marked on it.

During the third and final phase, the aesthetic aspects could not be duplicated by modern machines, so the

human touch was essential to achieve the perfect finish. Craftsmen used their hands and skills to age the Astrolabe to resemble the original. It was an outstanding success.

The replica of Champlain's Astrolabe was a perfect token for the "Master Craftsman" exercise, which re-enacted the laborious voyage of Alexander Mackenzie in 1792. On this voyage, Mackenzie finally reached the Pacific Ocean, completing Champlain's mission. To celebrate the bicentennial of this event, the REME Corps invited selected individuals of the LEME Branch to accompany them on their intrepid voyage. Champlain's Astrolabe could not have been a better chosen symbol to

represent the spirit of adventure in those who participated, and also to tighten the bond between the Canadian Forces Electrical and Mechanical Engineering Branch with their mother Corps, The Royal Electrical and Mechanical Engineering engineers. (See EME Journal 1/93 for the story)

A replica of the Astrolabe was therefore offered by Canadian Forces Craftsmen to their British Army colleagues. A second replica is displayed at the Electrical and Mechanical Engineering School in Borden, Ontario and the third one was given to the Canadian Museum of Civilisation in Hull, Quebec.

## DCMEM 4 Supports Sappers with Advanced Hydraulic Tools

The Trailer Mounted Hydraulic Tool System (TMHTS) is the latest piece of equipment in the Field Engineer's conversion from pneumatic to hydraulic tools. It was developed to be a stand-alone system to augment Field Engineer requirements on larger tasks.

The TMHTS is a steel shelter on a 3 1/2 ton SMP trailer chassis. The body opens up like a "lunch truck", with large upward swinging doors on all sides to allow maximum access to the interior. While up, the doors also provide some protection from the weather.

The front of the shelter contains the chassis mounted Stanley HP-3 hydraulic power unit which powers two hydraulic hose reels and one air hose reel. The HP-3 is diesel powered, 24 volt and mounted on a roll out tray for easy maintenance.

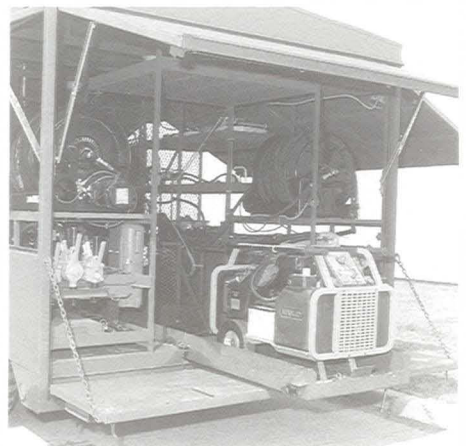
The tools, removable equipment, and the HP-3 control panel have been grouped on the curb side and rear of the shelter to make them easily accessible to the user. Some of the tools contained are an impact wrench, hammer drills, sinker drills, chain saw, cut-off saw, grinder and a water pump; all complete with accessories. In addition, there are two Arc-Air cutting torch kits, a set of inflatable air-lifting bags and a Stanley HP-1 portable hydraulic power source for use away from the trailer.

Extensive testing at LETE has confirmed that the TMHTS is robust, mobile, and meets climatic and rail transport criteria.

After a field trial in Spring 92, production and fielding of the TMHTS is expected by Spring 93.



*Trailer Mounted Hydraulic Tool System (TMHTS). Street side and rear view.*



*Rear view*

# Tanks a Lot!!!

*by Captain Scott Fuller*

In obvious delight, Chief Warrant Officer "TINY" Nault, the Senior Fire Control Systems Technician in the Project Management Office Light Armoured Vehicle grins his approval in the driver's seat of a former Warsaw Pact, East German Variant, T-72 Main Battle Tank. CWO Nault was part of a group of staff members of PMO LAV who recently toured the warehoused collection of military artifacts of the Canadian War Museum under the direction of Mr. Harry Martin, the curator of Weapons and Technology. Other artifacts viewed

were a late 1930's FORD Half-track Truck which was once studied as a prime-mover for Canadian artillery, an authentic VIKING sword in the edged weapons collection, and a Russian T-34 WW2 Main Battle Tank. MWO

Lynda Busby (now CWO) joins retired CWO Gerry Cleary in the cab of the early 30's half-track FORD truck.

*Photos by Captain Scott Fuller*



## Testing of Thermal Camouflage Systems

Constant technological advances are radically changing the requirements of field operations, and the area of camouflage is no exception. DCGEM (Directorate of Clothing, General Engineering and Maintenance), as the Life Cycle Materiel Manager (LCMM) for camouflage systems, is actively participating in the growth and development of new techniques and materials for camouflaging equipment and personnel. This work is undertaken at the request of DMER (Director Military Engineering Requirements), who is responsible for the

army's CCD (Camouflage, Concealment and Deception) programme. Working closely with DREV (Defence Research Establishment Valcartier), LETE (Land Engineering Test Establishment), QETE (Quality Engineering Test Establishment) and various NATO forums, DCGEM is now working with thermal infrared counter-surveillance materials that are needed to meet the needs of the future.

The spectrum, in general counter-surveillance terms, is divided into several regions, including: ultraviolet,

visual, near infrared, far infrared (thermal) and radar. In the far infrared band, thermography, or thermal imaging, is simply a technique used to measure the difference in temperature between a target and its background. This is quite complex, as the target and background signatures vary independently due to their physical makeup and the influences of external and interior heating, both mechanical and solar.

DCGEM is presently investigating winter camouflage systems to deter-



mine the advantages of specialized thermal camouflage nets, applique patch kits and thermal blankets. Thermographic testing was carried out at LETE during the winter to compare the thermal IR properties of three different winter camouflage systems.

During these tests, the camouflage systems were erected in the typical winter setting of a target deployed along a wood line (see Photograph). A thermal imaging sensor (long and short waveband lenses to cover the full range of the infrared spectrum) was then used to observe and record the thermal characteristics of the targets and backgrounds. The following camouflage systems were deployed over a controlled heating source:

- a. a thermal arctic net on top of a thermal blanket;
- b. a thermal arctic net without thermal blanket; and
- c. a woodland net with camouflage patches on top of a thermal blanket.

A mobile elevated platform was used from which to take observations and to achieve as high an elevation as possible. This allowed the recorder to gather data which would approximate that which would be seen both from a surveillance aircraft and from the ground. The thermal characteristics of the systems were then measured over a period of four days. To differentiate between solar loading (the heating or cooling action of the environment) and actual heat dissipation of the heating source, two separate tests were carried out. One series was taken with the nets facing in a southerly direction and unaffected by shadows, while another series was taken in an area completely free of direct sunlight (this required a thermal screen or "umbrella").

From distances of 100m and 350m, observations were made with the thermal imaging kit, ensuring that the same angle was used in each series of observations. In order to accurately

interpret the gathered imagery, it was necessary to use a calibration source and to see it in every thermograph taken. This was done by using a "black body" source, which in this case was a small panel coated with a covering of known emissivity, which can be thought of in very general terms as a thermal reflection calibrator. The observations taken were the temperatures of different areas of the target and its background. This information was then used to generate accurate images of the target's thermographic profile. This enables a rational determination of effectiveness to be made, which leads to further development of materials and techniques.

Various techniques can be used to enhance the thermographic properties of a camouflage system. These include using disruptive thermal patterns through the application of special patches, areas of different materials or emissive paints and coatings. As with conventional camouflage, the purpose is not only to hide a target but also to alter its shape or appearance in order to hinder positive identification. For far-infrared

surveillance devices, this means degrading their ability to measure the temperature differences of target from its background.

LFC HQ recently decided that a series of trials should be conducted to determine the feasibility of replacing the present arctic net with one which is lighter in weight and equally effective in the far north and throughout the temperate zones of Canada. DCGEM will strive to include materials which have thermal infrared counter-surveillance properties in these trials.

DCGEM's future work in camouflage will soon extend into the radar portion of the spectrum. As the required testing equipment is extremely expensive, it is likely that much of this work will be conducted as joint trials in the NATO forum. Some work has been undertaken already but much remains to be done. DCGEM, in close cooperation with DMER, and in conjunction with DND's various testing and research establishments, will continue to address the counter-surveillance problem in order to provide the Canadian Forces with adequate camouflage systems.



*A typical winter setting of a target deployed along a wood line.*



# "That Darn Grizzly"

by DCMEM 2-4, Maj D.M. Merry

I imagine that the average reader of the EME Journal does so during coffee break, or whilst sitting in line at the MIR, or as an alternative to getting on with the real task at hand (I'm normally of the latter variety); and only if the other publications available are exhausted of any potential for intellectual titillation. So it won't come as a surprise if your initial reaction to this article is not a spontaneous outpouring of enthusiasm for the subject of a GRIZZLY turret mid-life improvement programme. In fact, the thought of the GRIZZLY having any life at all may come as a surprise. Just when you thought that the Multi-Role Combat Vehicle (MRCV) project would relegate AVGP to the scrap heap, here's a voice in the DGLEM hinterland to tell you how we're saving the GRIZZLY. Your concern is shared, but at the risk of incurring the Canada-wide vehemence of Infantry subalterns, I'll now make my sales pitch and leave you in slack-jawed wonder at the beauty and simplicity of the process.

As you may be aware, 269 GRIZZLY were purchased from Diesel Division, General Motors, of London, Ontario in the 78/79 timeframe. The vehicle is a 6x6 variant purchased as part of the Armoured Vehicle General Purpose project, and sports the Cadillac-Gage one-meter (turret ring diameter) turret with a 50 cal HMG and 7.62mm co-ax. Notwithstanding the derision normally inflicted by die-hard M113 tracked vehicle fans on their wheeled cousins, please note that the GRIZZLY represents the only under-armour HMG capability in the Infantry inventory. This is something you may wish to consider when you next stand in line at the supermarket cheese counter and ask "is the Oka fresh today?". Or perhaps if you have the fortune to carry the UN peacekeeping flag and the natives are hostile. From a

personal perspective, the latter is a more realistic consideration as I must worship (by medical edict) at the altar of King Cholesterol, and shopping is my wife's job (I'm the first to admit that she is my shopping superior). My personal "dream" UN deployment includes a vision of myself rolling along the Adriatic coastline in blue beret and little else, pausing briefly at FKK beaches to peer down at sun-bronzed goddesses from my GRIZZLY crew commander's station to ask "Pardon-moi cherie, mais où est la guerre?". The fact that the GRIZZLY is not programmed for replacement before 2005 enhances the probability of this UN scenario, although External Affairs will no doubt do its utmost to ensure a less inviting locale and more inhibited inhabitants.

As would appear to be the tradition with Army purchases, the GRIZZLY turret configuration is distinctly Canadian and is not shared with other nations. This situation leaves the prospective LCMM alone and out in the cold when it comes to in-service support. However, in a stroke of incredible luck (for the LCMM), the USMC selected the Cadillac-Gage design for use on the Amphibious Assault Vehicle AAV-P7A1, and currently have over 1,100 similar turrets of a configuration designated as the Up-Gunned Weapons Station (UGWS). This configuration includes a 40mm grenade launcher (Mk 19) with 50 cal MG which is also known as the 40/50 turret. The USMC purchased the design rights, and have product improved the original Cadillac-Gage design to produce an effective capability which they intend to deploy until the 2010 timeframe. This implies that data not available from Cadillac-Gage for the current GRIZZLY turret configuration can be obtained from the USMC "gratis" if we adopt the UGWS standard, and a large supply of spares will be assured.

What is currently a Canadian farm team turret now has a close major league cousin. And for a sum of money less than the current annual expenditure for COUGAR 76mm ammunition, we can refurbish all 269 GRIZZLY turrets to the UGWS standard, and provide a sustainable Infantry capability well into the next decade. Visions of overflowing spare parts bin dance in my head at the thought. No more excuses for shoddy turret maintenance. Universal back-slapping from the Operator ("You LEME guys really saved our bacon this time!"). Potential R&D projects with the USMC, probably in Florida or California in the winter months. Beaches near USMC R&D project locations, with no blue beret or blue anything else for miles.....

Through the foresight of my LCMM predecessors, funding was obtained to prototype a GRIZZLY turret to the UGWS standard. User trials have been performed, and the technical data package associated with Canadian unique assemblies (for example, a soft recoil mount to retrofit the C6 MG) is complete. I will not bore you with in-depth technical details (which normally inspire as much audience revulsion as the ubiquitous/notorious "org chart"), but in recognition of the technical nature of this publication, list the following salient details:

- a. M36E3 (7x) Day/Night Sight, with laser protection, heated sight head window, and wiper;
- b. refurbished Target Acquisition System;
- c. improved .50 mount to include new gun cradle with adjustable rear mount, new charger assembly, new spent link and case eject, and outboard bearing;
- d. new C6 soft recoil mount;
- e. 700 Round Ready Box for the C6;
- f. sealed turret bearing;



- g. replacement power traverse motor;
- h. new turret basket seats and floor;
- i. new turret slip ring (12 Channel); and
- j. new electrical harness.

I was fortunate to be in the LCMM position at a time when a turret refurbishment programme was as mature as it could be prior to contract award (ie, minimum technical risk). Another incentive to funds this programme was that the UGWS was in production for the USMC at their prime contractor, AV Tech Corp, near Detroit (ie, firm cost estimates). Virtually all Canada based GRIZZLY turrets were refurbished by 1 Apr 93.

Repatriation of GRIZZLY deployed with CAST in Norway (14) and UN forces (Cyprus x 6, Somalia x 51) during summer 93 will complete the fleet retrofit by Nov 93.

Production of turrets is relatively easy in comparison to the follow-on logistics support activity required to sustain the system. NSN cataloguing must be performed, new publications created, and operators/maintainers qualified. This process is an education in frustration - what should be a simple straightforward activity involves several different NDHQ directorates, each with differing priorities. The LCMM, as the nominal Programme Manager, is responsible for successful

programme completion, and is responsive to the operator to "make it happen".

On the basis of my experience with this programme, the "Technical Net" is alive and well and is fundamental to the conduct of our business. In a perfect world, all spare parts, publications and training would be in place before the equipment arrives on the ground, and I'd be out of a job. (Where's the beach!?) The local initiative of LEME tradesmen will be required to resolve the inevitable discrepancies found in interim publications, or to rectify Unsatisfactory Conditions. When in doubt, give us a shout!

## Weapons Technician in the Field

*Story by Cpl R. Pring, RCD Maint Tp*

0430 hrs, the phone rings. The voice on the other end lets out those words you've been staring at the ceiling waiting for: "BUG OUT!"

You couldn't sleep anyway, not because you were excited or anxious, its just because you knew the phone was going to ring sometime early that morning.

Weeks before that early morning, the Royal Canadian Dragoons Weapons Maintenance Shop had logged many X99 hrs on inspections and repairs. The AVGP Cougars are a full-time job in themselves. It seems you can never catch up with the repairs. Somehow the work gets done and the Regiment is ready to deploy to the field.

During those few weeks before the exercise and between repairs, section preparations must be completed. Personal kit must be serviceable - you don't want to find out you have a hole in your rain jacket at 0215 on sentry duty.

The MRT itself requires a lot of attention. First of all, driver maintenance must be done, then spare parts and tools must be checked and loaded. The truck should be self-sufficient for at least three weeks; this is your "little world" so you make it as livable as possible.

After an eight hour road move, the Regiment moves into the training area after breaking off into squadrons. Each weapons MRT stays with the squadron in the Squadron Maintenance Troop. If the Cougars are going to fire the following day, all the guns must be pulled back and checked out. By this time night is falling, which creates more of a challenge because of noise and light discipline.

The next morning, the first person you'll see slipping around on the deck of a Cougar is a weapons technician, doing last minute nitrogen pressure checks and bleeding air out of the buffer. The checks themselves are not difficult - it's the cam nets grabbing

your boots, slippery turrets, wet seats, and the dropping of a tool into the dark abyss of the turret basket.

Later on that morning, the Cougars start hammering rounds down range. All there is to do is watch and wait for things to break. Usually the first customer is a trooper carrying a C-5 machine gun. As he gets closer you can hear his mutterings of discontent, "Fires 2 rounds and stops!"

The C-5 machine gun is usually our best customer. They're old and tired and each seems to have a personality of its own. The Cougar seems to be able to blast away all day without any major problems. Replace a spring here, tighten a bolt there, and they're back at it.

At night, back in the hide, the fault sheets start to pour in. These faults can range from a two hour job on a Cougar to a ten minute job on a propane stove. After all the repairs are completed, it's back to the truck to clean up and hit the rack. Just before

you make it to the truck, the Maintenance Sergeant has an O Group to pass on; truck needs more cam, slit trench deeper and last but not least you're on sentry duty 0200-0400 hrs. Looks like rain!

"Due to the nature of his/her work, the Field Weapons Technician is required to practice his/her skills in all kinds of situations and environments. The weapons technician must be able to quickly assess and find solutions to all

sorts of problems and also be a dedicated and true soldier."

*Editor's Note: Cpl Pring is now a MCpl and working at CFB Moosejaw.*

## Operation Readiness

In the summer of 1991, under the auspices of the STI of Vehicle Company, CWO Clough(now RSM), the Sr NCMs and Warrant Officer Vehicle Techs of CFSEME pledged \$5000 towards the RCME 50th Anniversary Monument fund. The goal was set for Spring 1994.

The plan was to do a vehicle servicing consisting of oil and filter change, minor repairs, plus an inspection similar to an 1134. It started out with

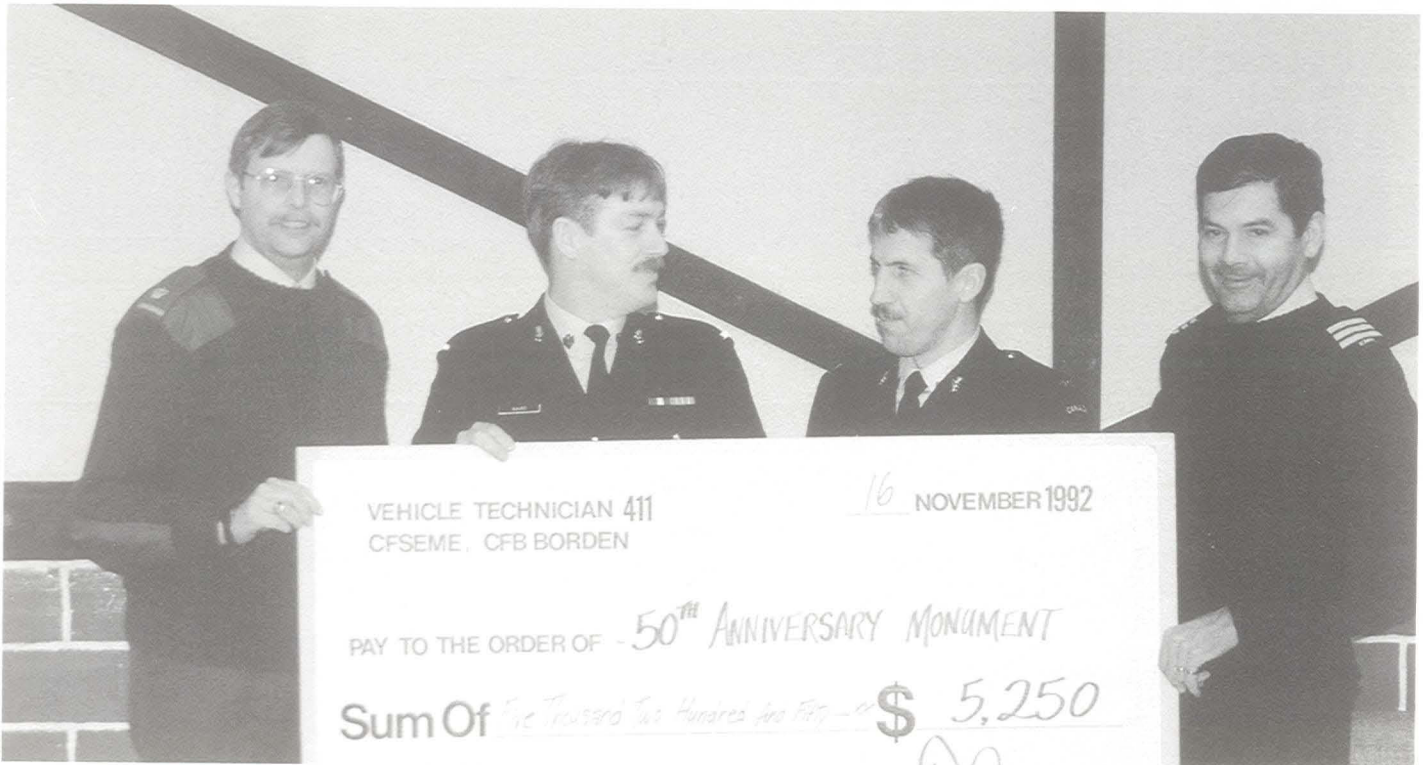
"Winterization 91", which saw approximately 150 cars serviced and as many happy customers.

"Summerization 92" serviced over 180 cars as the good word got out.

By "Winterization 92" it was apparent that the general populace had caught on that this was a great service for a small fee. 232 vehicles were serviced over a three-weekend period for a grand total of approximately 560 vehicles.

As a result, our goal of \$5000 was exceeded by \$250 by late 1992! Our donation of \$5250.00 was gratefully accepted by the Commandant of CFSEME, LCol Gillespie.

With our goal already attained and so much time left, it has been decided that OP Readiness will continue, albeit with a new purpose. Now the Jr NCM Vehicle Techs are getting in the picture with us and all future proceeds will be used towards the RCME 50th Anniversary Celebrations at CFSEME.



The Commandant of CFSEME, LCol Gillespie(right) receives the cheque from OC Vehicle Company, Maj Larry Rotchell, and Sergeants Bill Baird and J Bedard



# CFB Winnipeg TUA Modifications

With the initial issue of the TUA (Tow Under Armour) completed, there was the inevitable mod program to come. As with all projects or buys, modifications soon follow as user units try to make latest acquisitions fit their needs in the field. BEME CFB Winnipeg received its opportunity to be the first unit in Canada to implement the Mod program for the 6 TUA held by 2 PPCLI, with 12 mods in all for each TUA. Mods to the TUA included heater exhaust, CCTAS, pop-up latch, slip ring, mirrors, missile rack, sight protection, coax MG, engine exhaust, cargo web, and antenna relocation. A large task for any major workshop, but BEME Winnipeg welcomed the challenge as it exercised our abilities to be flexible, cooperative, highly skilled, and motivated.

As with all major tasks such as this, a certain amount of cooperation between Commands and units has to exist. Initial dialogue between Air Command, PMO AAP, and BEME Winnipeg established that facilities, technical expertise, and some manpower existed within the confines of the BEME organization. It was also established that additional manpower and resources, such as extra tooling and technical expertise, was required. Further dialogue with Mobile Command and 2 PPCLI alleviated most of the manpower shortages, and PMO AAP provided extra tooling and technical expertise.

All was set and ready to go, 24 Feb 92 was the date, carriers were in the compound, all local materials had arrived, workspace allocated, personnel eager, and then Construction Engineering (CE) dropped a bomb shell on us: "We are ready to install new lights on your vehicle floor." No problem, we closed off one-half of the available floor space and made do with what we had; a bit crowded, but it

could be done (flexibility). The Mod Team from Ottawa, consisting of a Supply WO, two Mat Techs, and one FCS Sgt, and headed by Capt Thériault and CWO Smulski, arrived on 20 Feb 92. They required three days to take stock of all supplies held at BEME and in the 3 Paul Bunyons shipped by the PMO AAP team. The Paul Bunyons arrived 2 days late, further complicating matters.

At 0800 hrs, 24 Feb 92, the whole team assembled for their initial briefing and orientation. Capt Thériault broke down the team into specific task-orientated teams, and after the expected uncertainties, the team settled down and performed its task. The Base Commander and BTSO

were impressed with the speed and quality of work, as the TUA Mod Program took only 771.8 hrs to complete, a full 3 days ahead of schedule.

A project of this size has shown our technicians that cooperation, good planning and team work can overcome any obstacles. CWO Smulski was very impressed with the technical skill and dedication of our craftsmen. The 5 members of BEME were Sgt B.C. McIntosh (Mat Tech), Cpl C. Kane (Veh Tech), Cpl D.M. Johnson (Wpns Tech), Mr. R.V. Halldorson (Term Civ Machinist), and Pte J.M. Labossiere (ELM Tech). All members worked hard and long hours and everyone felt a sense of accomplishment for being able to complete such a major task.



**The TUA Mod Program team was:**

(Back Row L to R) Capt Thériault, Sgt Eggelton, Sgt Baker, Pte Bechard, Cpl Johnson, Cpl Kane, MCpl Devaney, Cpl Douglas, Pte Yakabowich, Pte Labossiere, Sgt Cudmore, CWO Smulski.

(Front Row L to R) Sgt McIntosh, WO Dufour, Pte Erickson, Pte McNeill, Mr Halldorson, Cpl Billodeau.



# CAD/CAM at 202 Workshop Depot

In its strategy of modernization, and in order to remain competitive with private industry, 202 Wksp Depot has launched forth into the field of computer assisted design (CAD) and computer assisted manufacturing (CAM). These modern tools will make it possible to provide our customers with a quality product at a cost comparable to that charged by outside agencies. Given our role which is to offer versatile third and fourth line services involving among other things manufacturing and production resources, our CAD/CAM system enables us to manufacture complex parts required by a customer or intended to support large scale projects assigned to our unit.

What do we mean by a CAD/CAM system? Essentially, it is a computerized system which includes different consoles linked to a central computer. This makes it possible to manipulate the parameters at will, to analyze the

impact of modifications to the parameters, and to optimize the conditions under which components are manufactured. All the preliminary analysis can be done on the computer screen, thus minimizing the time associated with the development of drawings as well as the time required to manufacture prototypes prior to mass production. All these parameters and instruction sequences are saved electronically or on punched tape prior to the production phase.

The advantages of a CAD/CAM approach are numerous. The first tangible benefit is the reduction of the execution time of some operations. On the average, the time required for a technical drawing produced on our CAD consoles is reduced by approximately 60%. Once he has mastered the power of his software, the draughtsman gives all the parameters and the dimensions to the computer which reproduces the product on the

screen. As a result, the operator is able to perform on screen all the corrections or modifications which reflect the requirements of the customer.

Secondly, our CAD system allows our analysts to examine the interaction or the integration of different components by simulating the finished assembly of the part. We are able to examine up to 63 sub-levels and to see the relations which exist between some of these levels. The representation on the screen makes a quick correction of any error possible, well before the final production phase. The same is true for our CAM facilities where the analyst, with the aid of the screen, studies the different machining operations which will eventually be performed on our digital control machines (DCM). For instance, when the analyst modifies some parameters such as the rotating speed or depth of cut, he is able to verify the impact on production.

The third benefit identified has to do with a better use of our DCMs. Once they are programmed, the complex tools are able to mass-produce parts which involve complicated configurations, within very strict tolerances. Our latest acquisition, a VMC 150 milling machine, has a sensor which enables the operator to make the appropriate checks within the framework of the quality control program. Once the first manufactured part has been checked and its accuracy confirmed, then we are able to "launch" the production with the assurance of getting identical copies.

Even though adopting a CAD/CAM system makes it possible to increase productivity, achieve better quality control, and increase flexibility in the design of parts, there are disadvantages to overcome. One of these is considerable, namely the cost of initial



*A draughtsman explains his computer used for Computer Assisted Design.*



acquisition and of subsequent maintenance. We are always seeking tasks aimed at keeping our DCMs busy, thus making the investment more cost effective. The second obstacle is the training required by our personnel. In addition to training required to run the machines, we must maintain the expertise required to evaluate rapid changes in the field of data processing.

What does the future hold for 202 Wksp Depot's CAD/CAM strategy? We still have to examine the possibility of integrating the first two components (CAD/CAM) into a single system. This

is easier said than done. Part of the problem lies in the interface which we must create between the drawing software (IGDS) and manufacturing software (MEDS). In addition, we will need to develop the means to optimize the use of the whole system. Presently, some outside agencies are banking on the "Computer Assisted Logistic Support" (CALS) philosophy. Essentially, the aim of the CALS philosophy is to eliminate the whole mass of written documents dealing with a major project by linking the various participants through computers where the computerized exchange

of the required data would take place. Theoretically, our system would be compatible with the system which exists at Directorate of Publishing and Graphics Services (DPGS). As a result, 202 Wksp Dep employees would be provided with a fast means of access to the most recent technical information on a specific piece of equipment. Before this becomes a reality there are still some hurdles to overcome! However, we are pursuing our motto which is: "PREMIER PARMi NOS PAIRS" (FIRST AMONG EQUALS).

## Craftsman Training at CFB Edmonton

*by Captain W.G. McCutcheon,  
Production Officer*

The range of activities and equipment supported by BEME Edmonton enables the workshop to offer an extensive OJT (On Job Training) program to the Vehicle Technician craftsman. At any one time there may be as many as ten craftsmen at various stages of their OJT within the 84-man workshop. Since this constitutes approximately 25 percent of the vehicle trade, it is imperative that the majority of their time be spent on direct or indirect labour activities. When the craftsman arrives, he starts his training in the second line Vehicle/Recovery Section and is paired with one of the experienced civilian Vehicle Technicians who provides the technical guidance and ensures the quality of all work performed by the craftsman.

The progress of the craftsman is continuously monitored and formally assessed on a quarterly basis. Usually after the first three months he is transferred to one of the first line

sections. At this stage the craftsman becomes more familiar with the inspection cycles, reliability checks and troubleshooting of various vehicle systems. Since there are three first line sections, each providing support to totally different fleets, the craftsman spends three to four months in each section to familiarize himself with the

fleet the Workshop is supporting as well as the varying priorities.

Throughout the training cycle the craftsman is provided with a number of tasks to broaden his experience. Within the first six months the craftsman performs a bench-fitting project (brass cannon), which is designed to



*Cpl J.P. Exnowski removing the fuel tank from a crash-damaged MLVW; the bent frame will be replaced.*



increase his basic tool handling capabilities and promote a sense of individual pride in one's work. Upon completion, the cannon is evaluated to ensure it meets the project standards.

After a year of experience, the craftsman may be tasked as a member of the Annual Technical Inspection (ATI) Team which inspects a total of 12 units. Being a member of the team and working within a tight schedule

promotes teamwork and stresses the importance of ensuring a quick and effective completion of the assigned task.

Occasionally an opportunity for unique training presents itself as was the case in the replacement of a Medium Logistic Vehicle Wheeled (MLVW) frame which was severely bent due to accident damage. To complete the project, the vehicle had to be stripped

and all items tagged and inspected to ensure their serviceability. Utilizing two bays, the larger components were transferred directly from one frame to the other, but the greatest amount of time was spent on the installation of the smaller components, such as hoses and fasteners. Throughout the project, a QL 5 vehicle technician was aided by various craftsmen. The tear-down and subsequent installation and testing of each system within the MLVW framework provided excellent training for both the craftsmen and the senior technician.

Ultimately, an OJT program must adequately prepare the craftsman for his QL 5 Course by developing sound, fundamental skills. To achieve this, the workshop utilizes four main objectives:

- a. Provide a good foundation of technical knowledge on a variety of equipment;
- b. Timely counselling of performance and progress;
- c. Promoting a sense of pride in one's work; and
- d. Encouraging efficient teamwork.

The BEME Workshop at CFB Edmonton will continue to monitor and implement improvements to its craftsman training program to provide the most thorough and up-to-date OJT program possible.

*Editor's Note: Capt McCutcheon is now working at 2 Svc Bn in Petawawa.*



*Cpl J.P. Exnowski and Cfn R.O. Smith (right) stripping the MLVW frame.*



*A view of the workshop showing the three bays being used for the repair of the MLVW; the new frame is shown in the background.*



# Female EME Officers in Gagetown

by Maj K Horton

On paper it is merely two postings from Gagetown to Ottawa and an attached posting to an engineering field squadron. In reality, June 1991 brought to an end a significant bit of EME history that should be recognized and recorded before it is forgotten.

The event in question was the breaking up of what is thought to be the largest assembling of female EME officers in one maintenance organization. Base Maintenance Company, CFB Gagetown, boasted four female officers on establishment between January and June 1991.

This historical distinction belongs to clever career manager planning and Captain Donna Wood, Captain Kelli Lyzun, Lieutenant Lisa Fraser, and Lieutenant Madonna Mushrow.

Captain Wood arrived in Gagetown from DLES, NDHQ Ottawa, in August 1989. Upon settling into the Base Workshop, Captain Wood was assigned the task of OIC Weapons and Electronics Platoon, responsible for the second line repair of all weapons, FCS, and telecommunications equipment for CTC and Base Gagetown. After taking some time off to start a family she completed the last seven months of her tour as Workshop Support Officer. In August 1991, Captain Wood returned to NDHQ to work on CSS ADP in DG Log O.

Captain Lyzun arrived in Gagetown fresh off Phase IV in January 1989. Following six months as OIC Standard Military Pattern Wheeled Platoon, she was moved into the Workshop Support Officer position. During her busy time in Gagetown Captain Lyzun took some time to get married and, like Captain Wood, start a family. In June 1991, Captain Lyzun returned to the place of her on-job-training, DLAEEM,

where she took over the LCMM responsibility for the 35mm AD Artillery gun system.

Lieutenant Fraser braved a January 1990 winter trip to Base Maintenance Company after Phase IV and quickly moved into the position of OIC Composite Platoon, dealing with the first-line repair of all CTC ancillary equipment. In June 1990, Lieutenant Fraser took over the demanding job of OIC Armoured Vehicle Platoon. In this position she was in charge of 34 technicians and responsible for the first line repair to all CTC armoured vehicles (tracked and wheeled). During this time, Lieutenant Fraser also had the opportunity to be the Platoon Commander on the Junior Leaders Course run by CTC. June 1991 brought another change for Lieutenant Fraser as she was chosen for an attached posting to 22 Field Squadron, the engineering unit of CTC. As troop Commander of Admin Tp she is responsible for the administration, maintenance, supply, and transport functions of the Squadron and, as such, is one of the first female EME officers to command a first-line platoon in a field unit.

Last to arrive on the scene to complete the female officer establishment was Lieutenant Mushrow in January 1991. Again a Phase IV graduate, she was placed in charge of a platoon with 53 technicians. As OIC Standard Military Pattern Wheeled Platoon, she was responsible for the first-line repair of all CTC Wheeled vehicles and for all recovery calls on base and within the province of New Brunswick.

The culmination of this brief but noteworthy bit of history occurred on 15 May 1991 when, on the CFB Gagetown EME Rebadging Parade, four of the five platoons were commanded by female officers! Fortunately for Base Maintenance Company Gagetown, four very good young officers happened to pick Gagetown for their posting and subsequently created a little EME history.

*Editor's Note: Maj Horton is currently on Post-Graduate training in Virginia, Capt Wood is back in DLES, Capt Lyzun has retired from the CF, Capt Fraser is at CFB Moosejaw, and Capt Mushrow remains in Gagetown.*



*Lt Fraser, Capt Lyzun, Capt Wood, and Lt Mushrow.*



# Saint Jean de Brebeuf - Unveilled!

By: Lt D.M. Price, Prod O, 210 AD Wksp

On 5 Dec 91, the Air Defence Artillery School, in Chatham, N.B., had the pleasure of hosting Col Murray Johnston, our EME Colonel Commandant. Col Johnston arrived at CFB Chatham on the evening of 4 Dec just in time to attend the Air Defence Community's annual celebration of St-Barbara. Both Col Johnston and Col Nappert, at the time Project Manager

Low Level Air Defence, attended the Special Guest Night in celebration of St-Barbara's Day at the Officer's Mess. The next morning a tour of the AD Arty School facilities was highlighted by the dedication of a portrait of the EME Patron Saint, Saint Jean de Brebeuf.

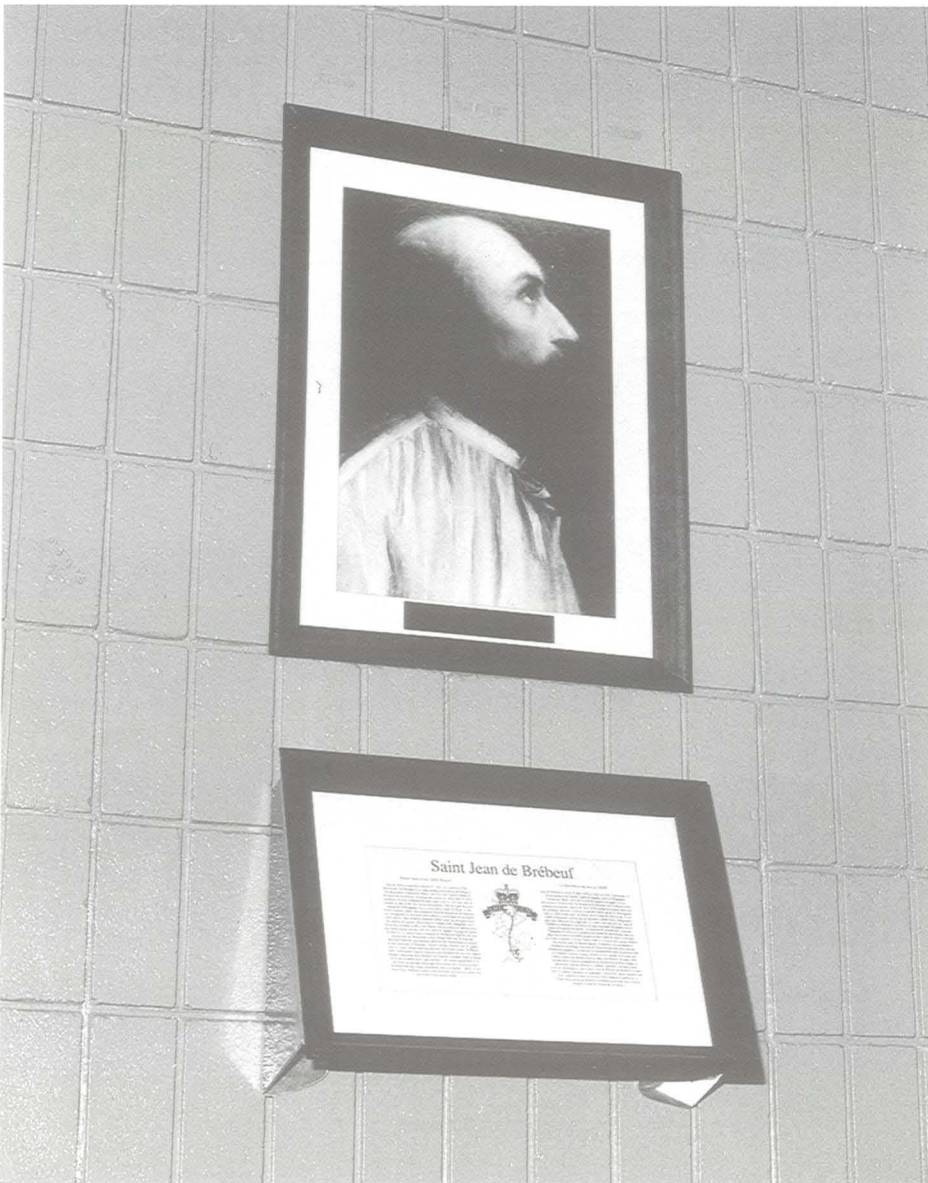
It was decided in 1986 that the EME Branch should identify a Patron Saint. Rather than adopting the Patron Saint of the Royal Electrical and Mechanical Engineers, it was decided that a

distinctly Canadian saint should be chosen.

At the LEME Senate meeting in May 1987, the recommendation was approved to adopt Saint Jean de Brebeuf for the following reasons:

- a. Like most of the Jesuits, he was engineering-oriented, having helped to found Sainte-Marie among the Hurons with its blacksmith shop, tailor shop, and shoemaker shop;
- b. With over 22 years in the New World, much of it among the Indians, he is certainly of Canadian flavour;
- c. He learned the Huron language and culture to such an extent that he was given "Chief" status by the Hurons in 1638 and allowed to speak for his "Tribe" (likely the missionaries) - quite an achievement in the area of leadership;
- d. The LEME connection is also appropriate considering that CFSEME, our Branch school in Borden, is in the same geographical area that Saint Jean de Brebeuf conducted his missionary work; and
- e. His activities as an apostle, adventurer, writer, linguist, engineer, and Canadian pioneer exemplifies service, much like LEME strives to serve in the CF.

With a blessing by Maj Landry (RC), Col Johnston proceeded with the unveiling of the portrait of Saint Jean de Brebeuf and concluded with a few words to the members of the AD Arty School. After seeing as much of CFB Chatham's maintenance facilities as possible, Col Johnston departed for home with his St-Barbara's certificate and the memory of meeting many of Chatham's Air Defence Technicians.



Portrait of our Patron Saint hangs in the AD Artillery School in CFB Chatham.



# Repair and Overhaul of the APC

by Capt Bill Taylor, DCMEM 2-2-2

What are the plans for the M113? The Product Improvement Program, which was introduced in 1978 to upgrade the APC, is complete, and a new program is underway at 202 WD to revitalize the M113 fleet. This new program is known as Inspect and Repair Only As Necessary (IROAN).

The IROAN program is a new concept in the overhaul and rebuilding process for the M113 APC FOV. In the past when the M113 fleet underwent repair and overhaul its many bits and pieces were replaced with new ones. Under the IROAN program the many bits and pieces are removed, inspected to a standard, and replaced only if necessary. Outstanding modifications are also completed. This method of rebuild is less labour- and parts-intensive, and therefore more cost effective.

The IROAN process begins with the selection of the vehicles by DCMEM 2 LCMM staff. The selection is based on usage: 20,000 km for the M113 APC, 18,000 for the LYNX, and 15,000 for the M548.

Each vehicle receives an in-inspection upon its arrival at 202 WD, after which it is stripped, leaving as many serviceable parts as possible on the vehicle. Such items as hatches, wiring harnesses and tiller bar mounts remain on the hull if serviceable. The hull is inspected for cracks, bends, gouges, and distortions that may affect the vehicle's operation.

The thickness and adhesion of the paint on the hull is the determining factor in the requirement for sandblasting. Since the procedure for sandblasting requires that the vehicle be completely stripped, and necessitates a longer painting time, the hulls will be sandblasted only if required.

The power plant assembly, which consists of the engine, transmission, and transfer case, is stall-tested in the vehicle during the in-inspection. Power plants that meet all performance specifications need not be removed from the vehicle unless modifications are required. Those that fail the stall tests will be subjected to further tests on a dynamometer prior to separation.

The electrical system is thoroughly inspected for proper function during the in-inspection. At the stripping stage, items such as instrument panels, interior warning lights, brackets, master switch box, and wiring harness can remain in the vehicle if they require only minor repairs. Major repairs require the removal of these items as applicable.

All doors and hatches are inspected for proper fit and function, and seals and gaskets are always replaced. Bushings, hinges and locking devices

are checked for wear. Doors and hatches found serviceable remain on the vehicle with the exception of the ramp door and engine access covers. Cupolas on the LYNX are removed for inspection. The track system is disassembled, inspected, and repaired in lieu of automatic replacement.

To inspect and repair the M113 in this fashion requires between 700 and 900 hours per vehicle. This is good news; under the old system, approximately 1200 hours were required. The final product is a fully functional vehicle, meeting the minimum level of performance in all areas for which it was designed. While the vehicle is certainly not "like-new", its lifespan is increased, and its reliability assured.



This issue of the EME Journal includes a new feature. Capt Dan Scuka is a staff officer at NDHQ, specifically DLES 2-2-4. He has served at CFSEME, as Technical Adjutant of 1 RCHA, and has even done some time in Somalia. To help ease the "pain" of working at NDHQ and to provide amusement for others, he started a "Quote of the Day" which hangs outside his office. Each issue of the Journal will include the quote that, in the opinion of the editor, is the most noteworthy!

## ***Capt Scuka's*** **"QUOTE OF THE DAY"**

**"Captain is such a dashing title, I've always thought,"**

**She said, giving him a bright, brittle smile.**

**"I mean, colonels and so on are always so stuffy, majors are pompous,  
but one always feels somehow that there is something  
delightfully dangerous about a captain."**

---

from *Guards, Guards* by Terry Pratchett

Capt Scuka would like to think, of course,  
that this quote applies to him! If you have any suitable quotes by someone famous,  
or by the MCpl or Major you work for, please send them in.